PB-215 646

REPORT ON IMMEDIATE WATER POLLUTION CONTROL NEEDS, INTERSTATE AND INTRASTATE WATERS, LONG ISLAND REGION

Federal Water Pollution Control Administration
Metuchen, New Jersey

April 1967

DISTRIBUTED BY:

NTIS

National Technical Information Service
U. S. DEPARTMENT OF COMMERCE
5285 Port Royal Road, Springfield Va. 22151

PB 215 646

032

Report on
IMMEDIATE WATER POLLUTION CONTROL NEEDS
INTERSTATE AND INTRASTATE WATERS
LONG ISLAND REGION

Reproduced by
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. Department of Commerce
Springfield VA 22151

U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
HUDSON-CHAMPLAIN AND METROPOLITAN COASTAL
COMPREHENSIVE WATER POLLUTION CONTROL PROJECT
Matawan, New Jersey
APRIL 1967

LIBRARY
Dept. of the Interior, FWPCA
Region NE District

E R R A T A

for November 24, 1967

Report on
Immediate Water Pollution Control Needs
Interstate and Intrastate Waters
Long Island Region

Page or Table Number	
Page I-1	Paragraph 1, line 2. After the first sentence add, "The region also includes the waters of Long Island Sound and the New York Bight (Atlantic Ocean)."
Page II-3	Paragraph j, line 3. Revise to read, "...obtaining maximum waste treatment efficiencies; and ..." Paragraph k, line 4. Revise to read, "...operations."
Page III-1	Paragraph 6, lines 1 and 2. Revise "industires" to "industries."
Table III-2, pages III-6,7,8	Immediately following the table heading "Population served" add a reference mark for a footnote "c". Footnote "c", to be placed at the end of the table on page III-8, reads, "Population served for municipal sources; Population equivalent for industrial sources on a BOD basis, assuming an estimated daily per capita loading of 0.167 pounds of BOD.
Table III-3, page III-9	In this table delete all references to the present footnote "b". Immediately following the table heading "Population Served" add a new reference mark for a footnote "b" at the end of the table, "Population served for municipal sources; Population equivalent for industrial sources on a BOD basis, assuming an estimated daily per capita loading of 0.167 pounds of BOD." In the column of "Pop. Served" delete Totals of Pop. Served, 109,110 b/.
Table III-6, page III-13	Revise footnote a/ to read, "See Table III-4 and III-5 for definition..."
	Delete "New York State" at top of table.
Table III-9, page III-18	Revise footnote a/ to read, "See Table III-11 for definitions of construction activity codes." Revise footnote b/ to read "Population equivalent on BOD basis for industrial sources."
Table III-10, page III-19	Revise footnote c/ to read, "See Table III-11 for definitions..."

Page or Table Number	
Table III-12, page III-23	Delete "New York State" at top of table. Revise footnote a/ to read, "See Table III-11..."
Page IV-1	Paragraph 3, line 3. Revise to read, "...consisting of water pumped from the aquifer, and..."
Page IV-2	Paragraph 3, line 3. Revise to read, "...Nassau County Disposal District No. 2..."
Page V-1	After paragraph 1, insert the following paragraph. "The Commission has the power to make rules, regulations and orders with regard to pollution of coastal, estuarial and tidal waters of the Interstate Sanitation District which extends from Sandy Hook on the New Jersey Coast to include all of New York Harbor, and north on the Hudson River to northerly boundaries of Westchester and Rockland Counties. The district extends easterly into Long Island Sound to New Haven on the Connecticut shore and Port Jefferson on the north shore of Long Island. Along the south shore of Long Island, the district extends easterly to Fire Island Inlet."
Page VI-2	Paragraph 2, line 8. Immediately following "...three duck farm operations.", add the following sentence, "Duck farms on tributaries to this bay are listed in Table VI-3 on page VI-19." Paragraph 4, line 1. Revise to read, "...at least 24 duck farms..." Paragraph 4, line 4. Immediately after "Bay", add the following sentence, "Duck farms on tributaries to this bay are listed in Table VI-3 on page VI-19."
Page VI-4	Paragraph 2 (Flanders Bay), line 2. Revise to read, "Major causes of this pollution are one municipal treatment plant and...". Paragraph 2, line 4. Revise to read, "...approximately 12 duck farms...". Paragraph 2, line 5. After "...major sources of pollution." add "Duck farms on tributaries to this bay are listed in Table VI-3, on page VI-19." Paragraph 5, line 1. Revise to read, "There are 75 industrial..."
Page VI-6	Paragraph 4, line 1. Revise to read, "There are 131 industrial..."
Page VI-7	Paragraph 1, line 1. Revise to read, "...of the 170 municipal...".

Page or Table Number	
Page VI-8	Paragraph 2, line 6. Revise to read, "Sixty-four of these...".
Page VI-10	Paragraph 2, line 1. Revise to read, "There are approximately 39 duck farms..." Paragraph 2, line 5. Revise to read, "...Long Island Sound or Atlantic Ocean..." Paragraph 2, line 19. Add this sentence, "Duck farms on tributaries to this bay are listed in Table VI-3, on page VI-19."
Page VI-12	Paragraph 6, line 6. Revise to read, "...in the map following Table VI-4 on page VI-21. Table VI-4 summarizes...".
Page VI-13	Paragraph 2, line 5. Revise to read, "...Research Center, Public Health Service, USDHEW."
Table VI-1, page VI-15	Revise table heading to read, "Number of Pollution Discharges Excluding Duck Farms."
Table VI-1, page VI-16	Revise "Total Number of Pollution Discharges, Municipal and Federal, to Long Island Sound Basin", to "16."
Table VI-1, page VI-17	Revise, "Number of Pollution Discharges, Municipal and Federal, to Flanders Bay", to "1". Revise, "Number of Pollution Discharges, Industrial, Subsurface Drainage", to "75". Revise, "Number of Pollution Discharges, Municipal and Federal, Grand Totals" to "39". Revise, "Number of Pollution Discharges, Industrial, Grand Total" to "131".
Table VI-2, page VI-18	Revise, "Waste Sources, Intrastate Waters, Industrial, No." to "75". Revise, "Waste Sources, Total Inter- and Intrastate Waters, Industrial, No." to "131". Revise, "Waste Sources, Total Inter- and Intrastate Waters, Total, No." to "170".
Page VII-1	Paragraph 1, line 4. After "...south and east." add, "The Region also includes the waters of Long Island Sound and the New York Bight (Atlantic Ocean)."
Page VII-2	After paragraph 2 add the following paragraph. "In the ocean area adjacent to the Long Island Region--New York Bight--the general drift is southerly. Close

Page or Table Number	
	to shore, the currents, though variable, tend to flow towards the New York Harbor mouth along the New Jersey and southern Long Island coasts. The bottom currents in the Bight have a definite onshore component, necessitating great care in the disposal of long lived pollutants. The Hudson Channel across the continental shelf to the Canyon is punctuated by isolated basins which preclude the possibility of large scale disposal along it to the edge of the continental shelf."
Table VIII-1, page VIII-6	Revise column heading "Consumption" to read "Consumption" MGD

REPORT ON

IMMEDIATE WATER POLLUTION CONTROL NEEDS

INTERSTATE AND INTRASTATE WATERS

LONG ISLAND REGION

U. S. DEPARTMENT OF THE INTERIOR

FEDERAL WATER POLLUTION CONTROL ADMINISTRATION

HUDSON-CHAMPLAIN AND METROPOLITAN COASTAL
COMPREHENSIVE WATER POLLUTION CONTROL PROJECT

Metuchen, New Jersey

April 1967

TABLE OF CONTENTS

		Page
LIST OF TABLES		
I.	INTRODUCTION	I-1
II.	SUMMARY AND CONCLUSIONS	II-1
III.	IMMEDIATE CONTROL NEEDS	
	Introduction	III-1
	Interstate Construction Needs	III-1
	Needs by Priority	III-1
	Needs by Type of Construction	III-2
	Immediate Construction Costs, Interstate Waters	III-2
	Intrastate Construction Needs	III-3
	Needs by Priority	III-3
	Needs by Type of Construction	III-3
	Immediate Construction Costs, Intrastate Waters	III-4
IV.	OTHER MANAGEMENT AND RESEARCH NEEDS	
	Stream Surveillance Programs	IV-1
	Ground Water Surveillance Programs	IV-1
	Ground Water Recharge	IV-1
	Operation and Maintenance	IV-2
	Special Studies and Surveys	IV-3
V.	RECENT PROGRESS IN POLLUTION CONTROL	
	Interstate Action	V-1
	New York State	V-1
	Nassau-Suffolk Regional Planning Board	V-3
	Nassau County	V-4
	Suffolk County	V-4
	Federal	V-4
VI.	BACKGROUND FOR RECOMMENDATIONS	
	Known Water Quality Problems	VI-1
	Atlantic Ocean Basin	VI-1
	Long Island Basin	VI-2
	Ground Aquifers	VI-4
	Stream Categorization	VI-5
	Municipal & Industrial Pollution Sources	VI-6

	Page
Other Pollution Problems	VI-8
Septic Tanks and Cess Pools	VI-8
Dredging	VI-9
Sanitary Landfill	VI-9
Duck Farms	VI-10
Bottom Deposits	VI-10
Eutrophication and Aquatic Vegetation	VI-10
Pesticides	VI-11
Recreational and Commercial Navigation	VI-11
Ocean Disposal	VI-12
Salt Intrusion	VI-13

VII. DESCRIPTION OF THE REGION

Location	VII-1
Geology	VII-1
Hydrography	VII-1
Socio-Economic Characteristics	VII-2

VIII. WATER USE

Water Supply	VIII-1
Present Demands	VIII-1
Future Requirements	VIII-1
Recreation	VIII-3
Bathing	VIII-3
Recreational Boating	VIII-3
Parks	VIII-3
Sport Fishing	VIII-3
Waterfowl	VIII-4
Commercial Fishing	VIII-4
Shellfishing	VIII-4
Finfishing	VIII-5

IX. BIBLIOGRAPHY

APPENDIX A . . . CRITERIA FOR PRIORITY DETERMINATION

APPENDIX B . . . CONSTRUCTION ACTIVITY CODING

APPENDIX C . . . COST ESTIMATING PROCEDURES

LIST OF TABLES

Table Number	Title	Page
II-1	Estimated Costs for Upgrading Existing Municipal and Industrial Waste Facilities Through 1990 for Inter- and Intrastate Waters, Long Island Region, New York, Summary	II-5
III-1	Immediate Construction Needs by Priority, Interstate Waters, Long Island Region, New York, Summary	III-5
III-2	Immediate Construction Needs by Priority, Interstate Waters, Long Island Region	III-6
III-3	Immediate Construction Needs by Type, Interstate Waters, Long Island Region, New York, Summary	III-9
III-4	Immediate Construction Needs by Type, Interstate Waters, Long Island Region, Municipal Needs	III-10
III-5	Immediate Construction Needs by Type, Interstate Waters, Long Island Region, Industrial Needs	III-11
III-6	Immediate Construction Costs, Interstate Waters, Long Island Region, Municipal, Institutional and Industrial Needs Through 1990	III-13
III-7	Estimated Cost of Replacing Individual Cesspools and Septic Tanks with Municipal Facilities to Serve Long Island Region, New York Through 1990	III-14
III-8	Immediate Construction Needs by Priority, Intrastate Waters, Long Island Region, New York, Summary	III-15
III-9	Immediate Construction Needs by Priority, Intrastate Waters, Long Island Region	III-16
III-10	Immediate Construction Needs by Type, Intrastate Waters, Long Island Region, New York, Summary	III-19
III-11	Immediate Construction Needs by Type, Intrastate Waters, Long Island Region, Industrial Needs	III-20
III-12	Immediate Construction Costs, Intrastate Waters Long Island Region, Industrial Needs Through 1990	III-23
VI-1	Long Island Region Water Quality Problem Areas	VI-15
VI-2	Waste Sources in the Long Island Region, Summary	VI-18

LIST OF TABLES (Cont'd)

Table Number	Title	Page
VI-3	Long Island Duck Farm	VI-19
VI-4	Total Volume of Several Wastes Dumped in the New York Bight	VI-21
VII-1	Distribution and Projection of Population in the Long Island Region, by Region and County, 1960 and 1990	VII-4
VIII-1	Municipal Water Facilities Serving 1000 Persons or More, Long Island Region, Summary	VIII-6
VIII-2	Major Water Supply Systems, Long Island Region	VIII-7
A-1	Priority Criteria - Municipal Wastes	Appendix A
A-2	Priority Criteria - Industrial Wastes	Appendix A
B-1	Municipal Construction Activity Codes	Appendix B
B-2	Industrial Construction Activity Codes	Appendix B

LIST OF MAPS

Number		Following
1	Waste Disposal Areas of Long Island Sound and New York Bight	Page VI-21
2	Long Island Region Municipal and Industrial Waste Sources, April 1967	Appendix C

I - INTRODUCTION

This report reviews the water pollution problems in the Long Island Region, which consists of Nassau and Suffolk Counties in New York State. The discharge of waste from municipalities and numerous other sources degrades water quality and prevents full utilization of this natural resource throughout the Region.

The purpose of this report is to delineate those actions which should be undertaken immediately to prevent further degradation of these waters. Such actions include not only construction of new or improved municipal and industrial waste treatment facilities, but also those studies, surveys and research which must be completed prior to development of sound water quality management programs for the future.

The recommendations included in this report are based on existing data, known to be inadequate in certain cases. These data, obtained from published documents, from State agency files, and from the files of the Federal Water Pollution Control Administration indicate the need for additional studies to augment available information. Using the available data, and a scoring procedure described in the Appendix, the needed construction activities were determined in order of priority of urgency.

This report has been prepared under the authority of the provisions of the Federal Water Pollution Control Act, as amended, and in accordance with Presidential Executive Order 11288, "Prevention, Control and Abatement of Water Pollution by Federal Activities."

II - SUMMARY AND CONCLUSIONS

1. The Long Island Region encompasses all surface-and groundwaters of Nassau and Suffolk Counties, Long Island Sound, and the New York Bight, that portion of the Atlantic Ocean near New York City. The inter- and intrastate waters receive the discharge of wastes from municipal waste systems, factories, individual sewerage systems, duck farms, watercraft and land drainage. As a result, these waters are polluted with bacteria, organic wastes, suspended solids, toxic chemicals and nutrients.

2. The governmental agencies within the Region which have primary responsibility for water pollution control are the New York State Department of Health and the Interstate Sanitation Commission. Assistance and/or coordination is provided by the Federal Water Pollution Control Administration.

3. Pollution of these waters not only presents a hazard to the health of persons using them for water supply and water contact recreation, but also restricts full utilization for fish and wildlife, industrial and agricultural needs, and presents an unsightly and objectionable appearance. Such degradation can result in deterioration of much of the regional economy which is based in large part on recreation and similar water-based activities.

4. The major sources of pollution of these waters are raw and inadequately treated municipal, industrial and duck farm wastes. There are 97 known industrial and municipal sources of waste which affect interstate or intrastate waters and which require pollution abatement action. The major industrial source is the food and beverage industry. No Federal sources require pollution abatement action.

5. The interstate waters of the Region are affected by the discharge of inadequately treated wastes from eight municipal and 36 industrial waste sources. Of the municipal sources, one provides no treatment and the remaining seven have primary plants which are obsolete. Only one municipality does not disinfect waste prior to discharge.

6. Thirty-nine duck farms, situated on or near streams, contribute water loads which deteriorate the water quality of the streams. No data are available on costs for eliminating this pollution.

7. There are no municipal or Federal sources degrading intrastate waters within the Region. Approximately 53 industrial waste sources were identified as pollution problems to intrastate water areas of the Region.

8. To achieve satisfactory water quality, all municipal and industrial sources should receive a minimum of secondary treatment which, for the purpose of this report, is defined as 90 percent BOD removal and 95 percent removal of suspended solids. In addition, all municipal and most industrial wastes should receive effective disinfection. In certain cases, removal of nutrients and toxic materials is required in addition to the above. These treatment requirements are established for purposes of this report and serve as the guideline by which the immediate water pollution control needs and their estimated costs could be determined.

9. The greatest need is to provide municipal collection and treatment facilities to treat those wastes now going into septic tanks and cesspools.

The estimated cost to achieve this is $119,200,000 for Nassau County and $409,000,000 for Suffolk County. It is calculated that these expenditures would serve a population projected to 1990 of 3,190,000. These communal sewerage systems will eliminate most of the pollution entering the ground-water supplies.

10. The estimated cost of upgrading existing municipal facilities discharging into interstate waters totals $7,501,000 with the major portion ($7,340,000) required to replace obsolete primary plants.

11. The estimated cost to abate industrial pollution on inter- and intrastate waters of the Region totals $16,000,000.

12. A summary of immediate needs costs to correct municipal and industrial sources of pollution on inter- and intrastate waters is presented in Table II-1.

13. In addition to the waste discharges from individual cesspools and septic tanks, municipalities and industries, water quality within the Region is degraded to an unknown degree by wastes from such sources as duck farms, dredging, ocean disposal, salt water intrusion, recreational and commercial watercraft, agricultural runoff, pesticides, by heat from power plants and industries, bottom deposits, aquatic vegetation, and by natural aging and enrichment of the lakes and ponds.

14. To make possible the control of pollution from these sources, and to ensure the funds required as above for immediate construction activity result in improvement of water quality, additional legislation, studies and planning will be required.

15. The State of New York should expand its manual and automated surveillance network.

16. The State of New York should adopt and implement additional laws which recognize the need for regional planning in water resource development and require local governments to consider regional plans in terms of water supply and waste treatment.

17. The Federal Water Pollution Control Administration should assist on-going state programs by undertaking cooperative studies, surveys and research in the following areas:

a. Location of areas with high densities of individual septic tanks and cesspools, and the effects of such systems on surface and ground water quality;

b. Effects of stormwater overflow and urban runoff on water quality, and methods to control such sources;

c. Field sampling and laboratory analyses to determine present water quality in those areas where existing data are inadequate;

d. Types and amounts of agricultural chemicals used in the Region, with a determination of the effects of runoff of such pollutants on the receiving waters;

e. Location of areas with obnoxious growths of aquatic weeds and algae, with control measures to reduce nutrient inflow to such waters as well as to eliminate present problems by physical removal or chemical control;

f. Location and extent of thermal pollution problems;

g. Accurate and current inventories of all sources of municipal and industrial waste, to include waste volumes and characteristics;

h. Feasibility of joint municipal-industrial treatment facilities, to include any needed pre-treatment of industrial waste;

i. Magnitude of the problem of pollution by recreational and commercial watercraft, to include oil pollution, and needed control procedures to abate this source of pollution;

j. Training of both waste treatment operators and state regulatory personnel in the need for and means of obtaining maximum waste treatment efficiencies;

k. Extent of water quality degradation due to dredging and associated activities to include coordination of Federal, state, local and private interests in dredging operations; and

17. New York State should undertake additional studies, surveys and programs of the following:

a. Feasibility of replacing individual waste disposal systems by municipal collection and treatment facilities;

b. Inventory boat marinas to determine the adequacy of present on-shore treatment devices, and the need for such devices to handle waste from recreational boating; and

c. Determination of the magnitude of pollution from camping facilities, and means to control such sources.

18. An investigation of the existing legal and institutional arrangements which deal with water quality problems on a local, regional or statewide basis must be undertaken to determine their adequacy in effecting and implementing water pollution control programs.

19. Investigations must be carried out to determine the fiscal contribution of each basin entity (government and private) to meet expenditures required for immediate and long range pollution control and resource management programs. The role of Federal, state, local and private bodies must be evaluated in terms of costs and benefits. An indication of the economic impact water pollution abatement may have on the Region as a whole should be determined if programs aimed at achieving better water quality are to receive an appropriate share of public and private expenditures.

20. A need for close coordination of water quality problems indicates that a regional approach is best suited to promote inter-local cooperation between municipalities, to coordinate planning among townships and counties, and to administer state and Federal programs. Regional water management authorities must ensure that the needs of the minor or tributary river basins are reviewed, weighted and/or integrated into the major river drainage basin programs.

TABLE II-1
(SUMMARY)
ESTIMATED COSTS FOR UPDATING EXISTING MUNICIPAL
AND INDUSTRIAL WASTE FACILITIES THROUGH 1990
FOR INTER- AND INTRASTATE WATERS,
LONG ISLAND REGION, NEW YORK[a]

Construction[b] Activity Code (MUNICIPAL)	Interstate Number Plants	Interstate Cost ($000)	Intrastate Number Plants	Intrastate Cost ($000)	Total Number Plants	Total Cost ($000)
01	1	161	-	-	1	161
02	7	7,340	-	-	7	7,340
	8	7,501	-	-	8	7,501
Construction[b] Activity Code (INDUSTRIAL)						
A	3	3,707	3	606	6	4,313
B	5	1,120	7	2,730	12	3,850
C	20	1,318	38	1,680	58	2,998
D	8	3,576	5	1,328	13	4,904
	36	9,721	53	6,344	89	16,065
Priority[b]						
I	-	-	4	177	4	177
II	3	134	29	3,886	32	4,020
III	41	17,088	20	2,281	61	19,369
IV	-	-	-	-	-	-
	44	17,222	53	6,344	97	23,566

a/ Does not include costs for abatement of pollution from duck farms.

b/ See Table III-4 and III-5 for construction activity codes and Appendix A for priority criteria.

III - IMMEDIATE CONTROL NEEDS

To determine the immediate corrective actions necessary to ensure the preservation, development and enhancement of natural waters within the Region, an evaluation was made of immediate construction needs for each known municipal and industrial waste source. Non-construction needs, including research and field studies, are discussed in Section IV of this Report. In developing the needed construction activity, it was recognized that secondary treatment was the minimum permissible to provide that the need for such water uses as water supply, recreation and sport fishing could be met. Using this criteria, as well as such additional factors as dilution water available, strength and volume of waste discharge, existing treatment, and the use of the receiving water, a system of priorities was formulated to identify the most significant problem areas.

All waste sources (except individual systems) requiring corrective action were classified into one of four priority groupings ranked in descending order of urgency. Further details on the criteria used to develop these priorities are provided in the Appendix, but in general, those sources with relatively high population equivalents in terms of BOD loading, those with little or no treatment and those which discharge into streams which have only small amounts of dilution water were assigned the highest priorities.

The following sections present these immediate construction needs, together with estimated costs and priority, for both the interstate and intrastate waters of the Long Island Region.

INTERSTATE CONSTRUCTION NEEDS

The interstate waters of the Long Island Region are effected by eight known municipal and 36 industrial waste sources which require some form of immediate abatement. The municipal waste sources serve an estimated 24,000 persons. Only one is not chlorinated. On a BOD basis, the industrial waste loadings needing abatement, are estimated to be equivalent to that from 85,000 persons, approximately three and one-half times the municipal loading needing abatement. No Federal waste sources require abatement.

Needs by Priority

Table III-1 summarizes the needed construction activity by priority of urgency. Table III-2 indicates the specific sources in each priority. No municipal or industrial waste sources were classified into a Priority I category, sources demanding the most urgent attention.

Priority II includes three industires, whose discharge data are not available. These three industires are: the Wittnauer Division of the

Longines-Wittnauer Watch Co., Lynbrook, N. Y., and the Long Island Produce and Fertilizer Co., Bayshore, N. Y., both of which are suspected of discharging toxic materials with their wastewater, and Rason Asphalt, Port Jefferson Station, N. Y. which discharges a waste containing suspended solids in concentrations of 10,000 mg/l.

Included in Priority III are eight municipal waste systems which serve 24,250 persons. Of these sources, the obsolescent and overloaded primary plants at Northport and Ocean Beach and the obsolescent primary plant at Port Jefferson are the largest. In addition, Priority III includes 33 industrial sources. These sources represent an estimated population equivalent of 84,860 persons, of which Long Island Packers, Eastport, contributes 33 percent and Riverhead Duck Processing Co-op, Riverhead, another 18 percent.

No municipal or industrial systems were placed in the least urgent Priority IV category.

Needs by Type of Construction

Table III-3 summarizes immediate construction needs in the interstate waters by type of construction required. Table III-4 presents detailed needs by source for municipal systems and Table III-5 for industrial sources. Over 24,000 persons are served by seven obsolescent primary treatment facilities which will require construction of complete secondary treatment facilities.

Of the industrial sources requiring corrective constructions, three food plants account for almost 60 percent of the total estimated industrial load needing secondary treatment facilities and disinfection. Eight other industrial firms need segregation of wastes with biological treatment plus chlorination. Twenty industries need segregation of waste and non-biological treatment. The remaining five industrial plants require only construction of appropriate secondary treatment facilities.

Immediate Construction Costs, Interstate Waters

The estimated costs of needed construction for sewered systems on interstate waters are summarized in Table III-6 for both municipal and industrial systems. To finance this program of immediate corrective action to existing facilities will require an estimated expenditure of at least $17,200,000. Of this total, $7,500,000 is needed to provide new secondary facilities for all eight municipal systems on interstate waters. Almost $10,000,000 is the estimated amount required to correct

industrial pollution. The cost estimates are based on plant capacity sufficient to handle anticipated organic loads projected to 1990. Details on the procedures used for cost estimation are in the Appendix.

Because more than three-quarters of the Region's resident population are presently obliged to use individual waste systems (septic tanks and cesspools), cost estimates for replacing these inferior and often unsafe systems are presented in Table III-7. It should be pointed out that the estimated cost of $119,200,000 will purchase treatment for all of the presently unsewered and untreated areas of Nassau County. Less than half a million dollars more is required to upgrade existing Nassau County treatment facilities to service the remainder of the 1990 projected population.

The magnitude of the unsewered population problem in Suffolk County is estimated to be almost four times as great (replacement of individual systems will cost $409,000,000). This can be attributed to the fact that only a minor fraction of the county is presently sewered and that by 1990 Suffolk County's estimated population of 2.5 million will be 50 percent greater than Nassau's. Suffolk County's population's anticipated quadruppling between 1960 and 1990 contrasts sharply with Nassau's expected growth of only 25 percent.

INTRASTATE CONSTRUCTION NEEDS

There are 53 industrial waste sources and no municipal waste sources which discharge raw or inadequately treated sewage to the intrastate waters of the Long Island Region. In almost all cases, the industries discharge to the ground rather than to any recognized stream. The industrial sources account for an estimated BOD loading equivalent to approximately 31,500 persons.

Needs by Priority

Table III-8 summarizes the immediate construction needs for intrastate waters by priority of urgency. Table III-9 presents the priorities by individual sources. Priority I includes four industrial sources, all in the field of metal finishing, which are producing toxic wastes. Included in Priority II are 29 industries with a BOD population equivalent of 21,900. The other 20 industries are in Priority III. Many of the Priority II and III industries are also producing metal finishing wastes.

Needs by Type of Construction

Construction needs by type of facility are summarized in Table III-10 while Table III-11 presents detailed needed construction for the industrial waste sources. Seven industries, accounting for 65 percent of the known BOD loading need only construction of appropriate secondary treatment

facilities. Five other firms need segregation of waste and biological treatment. The remaining 38 industries require segregation of wastes and non-biological treatment.

Immediate Construction Costs, Intrastate Waters

The estimated costs to construct the needed treatment facilities to abate industrial wastes discharged into intrastate waters and/or to ground are presented in Table III-12. The total cost to abate industrial pollution is roughly estimated to be $6.3 million, the largest portion of which would go to provide secondary treatment for organic wastes. There are no municipal waste sources on intrastate waters.

TABLE III-1

IMMEDIATE CONSTRUCTION NEEDS BY PRIORITY
INTERSTATE WATERS, LONG ISLAND REGION,
NEW YORK, SUMMARY a/

Priority b/	No. Plants	Pop. Served c/
Municipal		
I	none	-
II	none	-
III	8	24,250
	8	24,250
Industrial		Pop. Equiv. c/
I	none	-
II	3	na
III	33	84,860
	36	84,860
Totals		
I	none	
II	3	
III	41	
	44	

na = Data not available.

a/ See Table III-2 for listing of individual sources.

b/ See Appendix A for priority criteria.

c/ Population served for municipal sources; Population equivalent on a BOD basis, assuming an estimated daily per capita loading of 0.167 pounds of BOD, for industrial sources.

TABLE III-2

IMMEDIATE CONSTRUCTION NEEDS
BY PRIORITY, INTERSTATE WATERS,
LONG ISLAND REGION

Source	Construction Activity Code [a]	Population Served
Priority I [b]		
A. Municipal		
None		
B. Industrial		
None		
Priority II [b]		
A. Municipal		
None		
B. Industrial		
Wittronics Div. Longines Witnauer Watch Co., Lynbrook	C	na
L.I. Produce & Fertilizer Co., Riverhead	C	na
Rason Asphalt, Port Jefferson Station	C	na
Priority III [b]		
A. Municipal		
Glen Cove STP (Morgan Is.), Glen Cove	02	1,100
Northport STP, Northport	02	6,000
Port Jefferson SD, Port Jefferson	02	3,000
Greenport STP, Greenport	02	2,600
Shelter Is., Hgts., Shelter Island	02	350
Sag Harbor, Sag Harbor	01	200
Ocean Beach STP, Ocean Beach	02	6,000
Patchogue SD, Patchogue	02	5,000

TABLE III-2

IMMEDIATE CONSTRUCTION NEEDS
BY PRIORITY, INTERSTATE WATERS,
LONG ISLAND REGION (Cont'd)

Source	Construction Activity Code [a]	Population Served
Priority III [b] (Cont'd)		
B. Industrial		
Sperry Rand Corp. Sperry Gyroscope Co. Div., Greatneck	C	na
Photocitcuits Corp., Glen Cove	C	na
Long Island Packers, East Port	A	28,000
Riverhead Duck Processing Co-op, Riverhead	A	15,000
Agawam Aircraft, Sag Harbor	C	na
Fairchild Hiller Electronic Systems Div., Bayshore	C	na
Clermont Polychemical, Roslyn Heights	C	na
Telephonics, Huntington	C	na
American Aviation Mfg., Oceanside	C	na
Young J & A, Inc., Copiague	D	7,000
Stylecraft Corp., Copiague	D	6,500
Cuddle Knit, Inc., Deer Park	D	4,000
Colonial Sand & Stone, Port Washington	C	na
Long Island Paint & Chemical, Glen Cove	D	950
Lizza Asphalt Construction Co., Oyster Bay	C	na
Rason Asphalt, Inc., Cedarhurst	C	na
Atlantic Processing Co., Amogansett	D	7,000
Precision Metal Finishing, Freeport	C	na
Helena Rubenstein, Greenlawn	C	3,600
Hazeltine Corp., Greenlawn	C	na
East Coast Food Corp., Riverhead	B	2,500
Murgus Corp., Lindenhurst	C	na
E. R. Laboratories, Greenvale	D	1,900
Penthouse Mfg., Freeport	D	800

TABLE III-2

IMMEDIATE CONSTRUCTION NEEDS
BY PRIORITY, INTERSTATE WATERS,
LONG ISLAND REGION (Cont'd)

Source	Construction Activity Code [a]	Population Served
Priority III [b] (Cont'd)		
B. Industrial (Cont'd)		
Wah Chang Smelting & Refining Co. of America, Glen Cove	C	na
Shelter Island Oyster, Greenport	A	3,000
Barrows Chemical Co., Inwood	B	2,000
Evsco Pharmaceutical, Oceanside	B	1,650
Justus Roe & Sons, Patchogue	C	na
Mary Chess Inc., Glen Cove	B	300
Islip Sanit. Laundry, Islip	D	440
Ziegler Chemical & Mineral Corp., Greatneck	B	220
Peck & Hale Inc., West Sayville	C	na
Total known population equivalent		84,860

na = Data not available.

a/ See Table III-4 and Table III-5 for definitions of construction activity codes.

b/ See Appendix A for priority criteria.

TABLE III-3

IMMEDIATE CONSTRUCTION NEEDS BY TYPE,
INTERSTATE WATERS, LONG ISLAND REGION,
NEW YORK, SUMMARY

Construction Activity Code [a]		No. Plants	Pop. Served
	Municipal		
01		1	200
02		7	24,050
		8	24,250
	Industrial		
A		3	46,000
B		5	6,670
C		20	3,600
D		8	28,590
		36	84,860
	TOTALS	44	109,110 [b]

[a] See Table III-4 and Table III-5 for definitions of construction activity codes.

[b] Total of known population equivalents.

TABLE III-4

IMMEDIATE CONSTRUCTION NEEDS BY TYPE
INTERSTATE WATERS, LONG ISLAND REGION,
MUNICIPAL NEEDS

Code 01: Discharging raw sewage → build secondary plant

Waste Source	Population Served
New York	
Sag Harbor	200
	200

Code 02: Not suitable for upgrading to secondary. Build new primary and upgrade to secondary.

Waste Source	Population Served
New York	
Glen Cove STP (Morgan Is.)	1,100
Northport STP	6,000
Port Jefferson SD	3,000
Greenport STP	2,600
Shelter Is. Hgts.	350
Ocean Beach STP	6,000
Pachogue SD	5,000
	24,050

TABLE III-5

IMMEDIATE CONSTRUCTION NEEDS BY TYPE
INTERSTATE WATERS, LONG ISLAND REGION,
INDUSTRIAL NEEDS

Code A: Provide secondary treatment or equivalent, including chlorination.

Waste Source	Population Equivalent [a]
New York	
Long Island Packers, East Port	28,000
Riverhead Duck Processing Co-op, Riverhead	15,000
Shelter Island Oyster, Greenport	3,000
	46,000

Code B: Provide secondary treatment or equivalent.

Waste Source	Population Equivalent [a]
New York	
East Coast Food Corp., Greenlawn	2,500
Barrows Chemical Co., Inwood	2,000
Evsco Pharmaceutical, Oceanside	1,650
Mary Chess Inc., Glen Cove	300
Ziegler Chemical and Mineral Corp., Great Neck	220
	6,670

Code C: Provide for segregation and separate treatment of one or more types of waste.

Waste Source	Population Equivalent [a]
New York	
Wittronics Div. Longines Witnauer Watch Co., Lynbrook	na
L.I. Produce and Fertilizer Co., Riverhead	na
Rason Asphalt, Port Jefferson Sta.	na
Sperry Rand Corp., Sperry Gyroscope Co. Div., Great Neck	na
Photocircuits Corp., Glen Cove	na
Agawam Aircraft, Sag Harbor	na
Fairchild Hiller Electronic Systems Div., Bayshore	na
Claremont Polychemical, Roslyn Heights	na

TABLE III-5

IMMEDIATE CONSTRUCTION NEEDS BY TYPE
INTERSTATE WATERS, LONG ISLAND REGION,
INDUSTRIAL NEEDS (CONT'D)

Code C: Provide for segregation and separate treatment of one or more types of waste (Cont'd).

Waste Source	Population Equivalent [a]
New York (Cont'd)	
Telephonics, Huntington	na
American Aviation Mfg., Oceanside	na
Colonial Sand & Stone, Port Washington	na
Lizza Asphalt Construction Co., Oyster Bay	na
Rason Asphalt, Inc., Cedarhurst	na
Precision Metal Finishing, Freeport	na
Helena Rubinstein, Greenlawn	3,600
Hazeltine Corp., Greenlawn	na
Margus Corp., Lindenhurst	na
Wah Chang Smelting & Refining Co. of America, Glen Cove	na
Justus Roe & Sons, Patchogue	na
Peck & Hale Inc., West Sayville	na
Total of known population equivalent	3,600

Code D: Same as C; with biological treatment plus chlorination for all or part of the waste load.

Waste Source	Population Equivalent [a]
New York	
Young J & A, Inc., Copiague	7,000
Stylecraft Corp., Copiague	6,500
Cuddle Knit, Inc., Deer Park	4,000
Long Island Paint and Chemical, Glen Cove	950
Atlantic Processing Co., Amogansett	7,000
H. R. Laboratories, Greenvale	1,900
Penthouse Mfg., Freeport	800
Islip Sanitary Laundry, Islip	440
	28,590
Grand total of known population equivalent	84,860

na = Data not available.

a/ Population on a BOD basis, assuming an estimated daily per capita loading of 0.167 pounds of BOD.

TABLE III-6

NEW YORK STATE
IMMEDIATE CONSTRUCTION COSTS
INTERSTATE WATERS, LONG ISLAND REGION, MUNICIPAL,
INSTITUTIONAL, AND INDUSTRIAL NEEDS THROUGH 1990

Priority[a]	No. Plants	Estimated Plant Cost[b]	Estimated Cost Ancillary Works[c]	Total Cost
		MUNICIPAL		
I	-	-	-	-
II	-	-	-	-
III	8	$4,108,000	$3,393,000	$7,501,000
IV	-	-	-	-
	8	$4,108,000	$3,393,000	$7,501,000
		INDUSTRIAL		
I	-	-	-	-
II	3	$89,000	$45,000	$134,000
III	33	6,391,000	3,196,000	9,587,000
IV	-	-	-	-
	36	$6,480,000	$3,241,000	$9,721,000
Construction Activity Code[a]				
		MUNICIPAL		
01	1	$88,000	$73,000	$161,000
02	7	4,020,000	3,320,000	7,340,000
	8	$4,108,000	$3,393,000	$7,501,000
		INDUSTRIAL		
A	3	$2,471,000	$1,236,000	$3,707,000
B	5	746,000	374,000	1,120,000
C	20	879,000	439,000	1,318,000
D	8	2,384,000	1,192,000	3,576,000
	36	$6,480,000	$3,241,000	$9,721,000

a/ See Table III-2 for Construction Activity Code and Appendix for priority criteria.

b/ Estimated plant cost = (1966 population served x factor projected to year 1990) x (unit cost per capita) x (projected 1970 FWPCA construction cost index) x (factor for engineering, legal and other fees).

c/ Estimated cost for ancillary work = (Estimated cost of Plant) x (.83).

TABLE III-7

ESTIMATED COST OF REPLACING INDIVIDUAL CESSPOOLS
AND SEPTIC TANKS WITH MUNICIPAL FACILITIES,
TO SERVE LONG ISLAND REGION, NEW YORK, THROUGH 1990

Estimated 1990 Population Served		Cost
	Nassau County	
840,000		$119,200,000 a/
	Suffolk County	
2,350,000		$409,000,000 b/
	TOTAL	$528,200,000

a/ Data for Nassau County were obtained from a 1966 report by Manganaro, Martin and Lincoln entitled "Outfall Sewer Location Sludge Disposal Facilities Disposal District No. 3".

b/ Construction costs were estimated by multiplying the estimated 1990 county population not served by upgraded existing facilities by a per capita cost. The capita cost factor was derived by dividing the population of the proposed Suffolk County Sewage District #1 into the estimated cost of that disposal system. The costs include the plant, the interceptor system, the ocean outfall, and the ground water recharge facilities. These data were obtained from a 1965 report by Bowe, Albertson and Walsh, entitled "Comprehensive Sewerage Studies, Five Western Towns, Suffolk County New York, Disposal District No. 1".

TABLE III-8

IMMEDIATE CONSTRUCTION NEEDS BY PRIORITY
INTRASTATE WATERS, LONG ISLAND REGION,
NEW YORK, SUMMARY [a]

Priority [b]	No. Plants	Pop. Served
Municipal		
I	none	-
II	none	-
III	none	-
Industrial		Pop. Equiv. [c]
I	4	na
II	29	21,900
III	20	9,516
	53	31,416
Totals		
I	4	na
II	29	21,900
III	20	9,516
	53	31,416 [d]

na = Data not available.

a/ See Table III-9 for listing of individual sources.

b/ See Appendix A for priority criteria.

c/ Population equivalent on BOD basis for industrial source.

d/ Total of known population equivalent.

TABLE III-9

IMMEDIATE CONSTRUCTION NEEDS BY PRIORITY,
INTRASTATE WATERS, LONG ISLAND REGION

Source	Construction Activity Code [a]	Population Served [b]
Priority I [c]		
A. Municipal		
None		
B. Industrial		
American Nickeloid Co., Garden City	C	na
Preferred Mfg. Co., Farmingdale	C	na
Davidson Corp. of Fairchild Camera & Instru., Commack	C	na
Sperry Rand Corp. Sperry Gyroscope Co. Div., MacArthur Field, Holebrook	C	na
Priority II [c]		
A. Municipal		
None		
B. Industrial		
Circle Wire & Cable, Syosset	C	na
Photo-Chemical Prod. Inc., Garden City	C	na
Empire Extrusions Corp., Garden City	C	na
Monitor Boxart Corp., Farmingdale	C	na
Maradel Products, Farmingdale	D	2,000
Edmos Products, Plainview	D	3,300
Viewlex, Inc., Holebrook	C	na
Weba, Inc., New Hyde Park	C	na
Ehrenreich Photo-Optical, Garden City	C	na
Poly Repro International, Garden City	C	na
Vanguard Instr., Roosevelt	C	na

TABLE III-9

IMMEDIATE CONSTRUCTION NEEDS BY PRIORITY,
INTRASTATE WATERS, LONG ISLAND REGION (Cont'd)

Source	Construction Activity Code [a]	Population Served [b]
Priority II [c] (Cont'd)		
B. Industrial (Cont'd)		
G & M Products, Hicksville	C	na
Eagle Beef Cloth Co., Hicksville	B	7,000
Optomechanisms, Inc., Plainview	C	na
Stop Motion Devices, Plainview	C	na
Aeroflex Lab., Inc., Plainview	C	na
Liberty Industrial Finishing Corp., Farmingdale	C	na
Kinemotive Corp., E. Farmingdale	C	na
Fairchild Stratos Corp. Electronics System Div., Wyandanch	C	na
Park Asphalt Corp., Deer Park	C	na
Colonial Sand & Stone, Farmingdale	C	na
CFI Div., Alloys Unlimited, Melville	C	na
Jarco Metal Prod., Westbury	C	na
Amperex Electronic Corp., Hicksville	C	na
Metalab Equipment Co., Hicksville	C	na
Budd Stanley, Syosset	C	na
Barth Vitamin Corp., Valley Stream	B	4,000
Natcon Chemical Co., Plainview	B	4,100
Dilectrix Corp., Farmingdale	B	1,500
Total of known population equivalent		21,900
Priority III [c]		
A. Municipal		
None		
B. Industrial		
Coca-Cola Bottling Co. of New York, Jericho	A	1,560
Servo Corp. of America, Hicksville	C	na
Judy Ann Ice Cream, Hicksville	A	426
Seven-Up Brooklyn Bottling Co., Melville	A	1,160

TABLE III-9

IMMEDIATE CONSTRUCTION NEEDS BY PRIORITY
INTRASTATE WATERS, LONG ISLAND REGION (Cont'd)

Source	Construction Activity Code [a]	Population Served [b]
Priority III [c] (Cont'd)		
B. Industrial (Cont'd)		
Continental Confections, Westbury	B	1,450
Farmingdale Industrial Laundry Service, Farmingdale	D	700
Knit Fabs, Garden City	D	2,200
Germaine - Monteil, Pinelawn	D	20
Suval Industries, Westbury	B	500
Plastic Papers, Inc., Hicksville	B	1,500
Van Son Holland Ink Corp. of America, Mineola	C	na
All-O-Matic Mfg., New Hyde Park	C	na
Irving Air Chute Co., New Hyde Park	C	na
Genzale Plating Co., New Hyde Park	C	na
Allmetal Screw Prod., Garden City	C	na
Seasonmasters, Inc., Westbury	C	na
General Instrument Semiconductor Prod. Group, Hicksville	C	na
Diamond National Corp. (U.S. Printing & Litho. Div.), Mineola	C	na
Secoa Electronics, Inc., Westbury	C	na
Anthonsen's All Metal Products Co., Westbury	C	na
		9,516
Grand Total of known population equivalent		2,148,000

na = Data not available

a/ Population equivalent on BOD basis for industrial source.

b/ See Table III-11 for definitions of construction activity codes.

c/ See Appendix A for priority criteria.

TABLE III-10

IMMEDIATE CONSTRUCTION NEEDS BY TYPE,
INTRASTATE WATERS, LONG ISLAND REGION,
NEW YORK STATE, SUMMARY [a]

Industrial [b]

Construction Activity Code [c]	No. Plants	Pop. Equiv. [d]
A	3	3,146
B	7	20,050
C	38	na
D	5	8,220
TOTAL	53	31,416 [e]

na = Data not available.

[a] See Table III-11 for listing of individual sources.

[b] No municipal or Federal facilities discharging into Long Island Region intrastate waters require construction.

[c] See Table III-11 for difinitions of construction activity codes.

[d] Population equivalent on BOD basis for industrial source.

[e] Total of known population equivalent.

TABLE III-11

IMMEDIATE CONSTRUCTION NEEDS BY TYPE,
INTRASTATE WATERS, LONG ISLAND REGION,
INDUSTRIAL NEEDS

Code A: Provide secondary treatment or equivalent, including chlorination.

Waste Source	Population Served
New York	
Coca-Cola Bottling Co. of New York, Jericho	1,560
Judy Ann Ice Cream, Hicksville	426
Seven-up Brooklyn Bottling Co., Melville	1,160
	3,146

Code B: Provide secondary treatment or equivalent.

Waste Source	Population Served
New York	
Eagle Beef Cloth Co., Hicksville	7,000
Barth Vitamin Corp., Valley Stream	4,000
Natcon Chemical Co., Plainview	4,100
Dilectrix Corp., Farmingdale	1,500
Continental Confections, Westbury	1,450
Suval Industries, Westbury	500
Plastic Papers, Inc., Hicksville	1,500
	20,050

Code C: Provide for segregation and separate treatment of one or more types of waste.

Waste Source	Population Served
New York	
American Nickeloid Co., Garden City	na
Preferred Mfg. Co., Farmingdale	na
Davidson Corp. of Fairchild Camera & Instr., Commack	na
Sperry Rand Corp., Sperry Gyroscope Co. Div., Mac Arthur Field, Holebrook	na

TABLE III-11

IMMEDIATE CONSTRUCTION NEEDS BY TYPE
INTRASTATE WATERS, LONG ISLAND REGION,
INDUSTRIAL NEEDS (Cont'd)

Code C: Provide for segregation and separate treatment of one or more types of waste. (Cont'd).

Waste Source	Population Served
New York (Cont'd)	
Circle Wire & Cable, Syosset	na
Photo-Chemical Prod. Inc., Garden City	na
Empire Extrusions Corp., Garden City	na
Monitor Boxart Corp., Farmingdale	na
Viewlex, Inc., Holebrook	na
Weba, Inc., New Hyde Park	na
Ehrenreich Photo-Optical, Garden City	na
Poly Repro International, Garden City	na
Vanguard Instr., Roosevelt	na
G & M Products Co., Hicksville	na
Optomechanisms, Inc., Plainview	na
Stop Motion Devices, Plainview	na
Aeroflex Lab., Inc., Plainview	na
Liberty Industrial Finishing Corp., Farmingdale	na
Kinemotive Corp., E. Farmingdale	na
Fairchild Stratos Corp., Electronics System Div., Wyandanch	na
Park Asphalt Corp., Deer Park	na
Colonial Sand & Stone, Farmingdale	na
CFI Div., Alloys Unlimited, Melville	na
Jarco Metal Products, Westbury	na
Amperex Electronic Corp., Hicksville	na
Metalab Equipment Co.	na
Budd Stanley, Syosset	na
Servo Corp. of America, Hicksville	na
Van Son Holland Ink Corp. of America, Mineola	na
All-O-Matic Mfg. New Hyde Park	na
Irving Air Chute Co., New Hyde Park	na
Genzale Plating Co., Franklin Square	na
Allmetal Screw Products, Garden City	na
Seasonmasters, Inc., Westbury	na

TABLE III-11

IMMEDIATE CONSTRUCTION NEEDS BY TYPE,
INTRASTATE WATERS, LONG ISLAND REGION,
INDUSTRIAL NEEDS (Cont'd)

Code C: Provide for segregation and separate treatment of one or more types of waste. (Cont'd).

Waste Source	Population Served
New York (Cont'd)	
General Instrument Semiconductor Prod. Group, Hicksville	na
Diamond National Corp. (U.S. Printing & Litho. Div.), Mineola	na
Secoa Electronics, Inc. Westbury	na
Anthonsen's All Metal Products Co., Westbury	na
	na

Code D: Same as C; with biological treatment for all or part of the waste load including chlorination.

Waste Source	Population Served
New York	
Maradel Products, Farmingdale	2,000
Edmos Products, Plainview	3,300
Farmingdale Industrial Laundry Service, Farmingdale	700
Knit Fabs, Garden City	2,200
Germaine-Monteil, Pinelawn	20
	8,220
Grand Total of known population equivalent	31,416

na = Data not available

TABLE III-12

NEW YORK STATE
IMMEDIATE CONSTRUCTION COSTS
INTRASTATE WATERS, LONG ISLAND REGION,
INDUSTRIAL NEEDS THROUGH 1990

Priority [a]	No. Plants	Est. Plant [b] Cost ($000)	Est. Cost [c] Ancillary Work ($000)	Total ($000)
I	4	118	59	177
II	29	2,591	1,295	3,886
III	20	1,520	761	2,281
IV	-	-	-	-
	53	4,229	2,115	6,344
Construction Activity Code				
A	3	404	202	606
B	7	1,820	910	2,730
C	38	1,120	560	1,680
D	5	885	443	1,328
	53	4,229	2,115	6,344

a/ See Table III-5 for construction activity code and Appendix for priority criteria.

b/ Estimated plant cost = (1966 population served x factor projected to year 1990) x (unit cost per capita) x (projected 1970 FWPCA construction cost index) x (factor for engineering, legal and other fees).

c/ Estimated cost for ancillary work = (Estimated cost of plant) x (.83).

IV - OTHER MANAGEMENT AND RESEARCH NEEDS

STREAM SURVEILLANCE PROGRAMS

To effectively accomplish the objectives of a water quality management program designed to protect and enhance prime water usages as established by State authorities, it is necessary that adequate stream surveillance programs be established. Such programs should include a network of manual and automated sampling stations which permit the collection, evaluation, and dissemination of water quality data, so as to present a clear picture of conditions in any section of the Long Island Region. These monitoring stations should be strategically situated near major wastewater sources so as to alert pollution control authorities to irresponsible or accidental discharge of harmful material. Hence, appropriate corrective actions can be taken immediately.

GROUND WATER SURVEILLANCE PROGRAMS

Ground water is much more important in the Long Island Region than in many other parts of the Hudson-Champlain Project area. Domestic, commercial, agricultural and industrial water needs are supplied almost entirely from aquifers. The water quality of the streams on Long Island is almost wholly dependent upon the quality of the ground water. Therefore, to effectively accomplish the objectives of a water quality management program, adequate ground water programs should be established. An ideal program would include a network of manual and automated sampling stations to provide the necessary data on conditions throughout the aquifers. These monitoring stations would provide a warning when undesirable levels of toxic wastes are found in the ground water. At the present time the best method of monitoring probably would be to sample waste water discharges before injection or seepage into the aquifer and analyze these waste waters for suspected contaminants.

GROUND WATER RECHARGE

During recent years parts of the aquifer underlying the Long Island Region have been affected by salt water intrusion. The discharge of the aquifer consisting of water pumped from the aquifer, surface and underground runoff to the Ocean and Sound has exceeded the recharge of the aquifer from precipitation, industrial wastes, and domestic septic tanks and cesspools. Because the discharge has exceeded the recharge, ground water levels are declining. One result of these lowered ground water levels has been the intrusion of salty water into the fresh water aquifer in some areas.

To supplement the present recharge of the aquifer, the recharge of treated domestic waste water is being investigated and is thought to have a great potential. One method under investigation is to inject into the aquifer renovated water--that is domestic waste water that

has been given tertiary treatment. This renovated water would meet all the standards promulgated by the U. S. Public Health Service for drinking water. The injection of reclaimed water could permit the pumping of additional water from the aquifer without causing further salt water intrusion. The degree of treatment and the techniques to be used for injecting the reclaimed water into the ground are important facets of the overall water supply problem and require intensive study.

Greater emphasis should be placed on the application of advanced waste treatment techniques, particularly in those areas where the discharge of secondary waste treatment effluent into small receiving waters results in degradation of water quality. The application of such advanced treatment techniques should be considered for both municipal and industrial wastes.

Two projects to study ground water recharge are being financially supported to a large extent by the Federal Government. One is located at Nassau County Sewage District No. 2 and will be operating at a rate of 400 gallons per minute. The other is located in Suffolk County and will use the effluent of the Riverhead secondary treatment plant. This second pilot plant will have an injection well constructed in a ground-simulator tank that will permit visual observation and microscopic bacterial, chemical, and physical examination of the soil and gravel envelope around the well screen.

OPERATION AND MAINTENANCE

An adequate program of operation and maintenance at waste treatment plants is necessary to ensure that the existing and recommended new municipal treatment facilities will be effective in maintaining adequate water quality. Proper operation of a waste treatment plant requires qualified personnel, proper laboratory control, and accurate record keeping. State, interstate and Federal agencies must provide programs aimed at ensuring these three factors are included at each plant.

Because of the limited supply of qualified operating personnel, there is an urgent need for both long and short term training courses in treatment plant operation. Such training should be continual, and should lead to state licensing of operators. Federal grants to aid the state in meeting its responsibility for the training of qualified personnel should be made available. Federally sponsored and conducted training programs should also be established to assist in the training of personnel.

In order to ensure the successful implementation of any operation and maintenance program, the state must have a sufficient number of trained inspectors to periodically visit plants to review operation and laboratory control methods, and to provide technical assistance to plant personnel.

In recent years, New York State has taken positive action to upgrade plant performance by improving operation and maintenance. Legislation enacted in 1964 established a fund which provides for the payment to municipalities of one-third the cost of operation and maintenance of adequate treatment plants. To qualify, municipalities must have standard operating reports which show performance and laboratory test data, a qualified operator in charge of the plant and the collection and conveyance system must minimize the amount of untreated waste discharged.

SPECIAL STUDIES AND SURVEYS

Municipal and Industrial Waste Inventory

A review of the available data on location, volumes and characteristics of existing municipal and industrial waste discharges within the Region indicates the need for more adequate information. The information contained in this report should be validated, in many cases requiring field surveys. In addition, once an adequate base inventory has been established, there is a need to keep the data current. The state should develop adequate records providing the latest information on all waste loads for use in planning and determination of further pollution abatement needs.

Septic Tank Survey

Within the Long Island Region there are more than 1,500,000 persons who dispose of domestic wastes by individual septic tanks or cesspools. The pollution affects many areas in the Region. Surveys should be conducted to determine the exact locations of pollution and the extent of its effects, and more important, to determine the feasibility of eliminating individual disposal systems by connection to existing or new municipal collection systems. Planning of such systems should be based on regional, inter-county and inter-municipal areas.

While the first two items could be accomplished by the Federal Water Pollution Control Administration in cooperation with State and Federal agencies, the third item is the responsibility of State and local government. Existing Federal grant programs could be used to accelerate the planning, design and construction of such regional collection systems.

Boat Pollution

There is a need to determine the magnitude of the problem associated with the discharge of litter, sewage, and oil from the large numbers of watercraft in the Region. Investigations should include research to develop practical means of controlling this source, surveys to determine the need for adequate disposal facilities at marinas, and a determination of adequate legislation to control such pollution.

In the latter respect, the State of New York has recently enacted legislation governing the discharge of wastes from vessels. These regulations, however, must be revised to include tidal waters, and require shore line facilities. Assuming the development of adequate legislation and satisfactory control devices, there will be a need for extensive enforcement activity throughout the waters of the Region to ensure control of this source.

Agricultural Runoff

There are no data available to indicate the extent of water pollution attributable to agricultural runoff. Since runoff from cultivated fields may convey fertilizers, herbicides and pesticides to the receiving waters, the potential dangers of such pollution require a thorough investigation. Such a study should include a determination of the types and amounts of agricultural chemicals being used, analytical data to measure the concentration of these chemicals in the receiving streams, and research into allowable concentrations and adequate control measures.

Water Quality Studies

The data included in Section VI indicate the extent to which existing water quality data are inadequate. Necessary field and laboratory sampling and analyses must be conducted to provide adequate data on existing water quality. Such information will not only confirm suspected problem areas and locate those areas with problems as yet unknown, but will establish a base against which future changes in water quality can be measured.

Dredging

Since extensive dredging activities are carried out in the Long Island Region, studies should be made to determine the extent to which such operations are affecting water quality. These investigations should result in the formation of plans which will help coordinate dredging activities with water resource management, and provide guidelines and practices to be followed during dredging operations.

Bottom Deposits

The extent to which banks of sludge and other substances have accumulated and are affecting the waters of the Region is not well known. A combination laboratory and field study is needed to determine the depth and rate of sludge buildup and the oxygen-uptake rate. The effects of toxic substances and/or oil buildup on the waters, oxygen resources and organisms should also be determined.

Sanitary Landfill

There is a need to study and evaluate sanitary landfill operations throughout the Long Island Region. These investigations should

determine the number and location of all landfill operations and the extent to which such areas are affecting water quality. The increasing amount of solid waste associated with the Region's growing population must also be considered in the study.

Ocean Disposal

There is a need to determine to what extent the disposal of sewage sludge and other wastes are affecting the waters of the New York Bight and Long Island Sound. A comprehensive evaluation of all aspects of the problem is required. Such a study should determine the general oceanography of the area, the effect of pollution on shallow inshore fish production, the migratory habits of fish in the area, and the extent of sludge buildup on the ocean floor and its effect on the ecology of the area. In addition, the study should determine the effect on marine life of dumping cellar dirt and dredged spoil material and the importance of river-borne wastes flowing into these waters. There is an increasing demand for ocean disposal of a variety of wastes, including radioactive materials, and their cumulative effects on fishing and other legitimate water uses must also be considered as part of any study in the Region.

Desalination Plants

If the proposed nuclear powered joint desalination and electric generating plant is built on Long Island, studies will be required to minimize the effects of disposing of the hot concentrated brines on the marine environment.

Data Systems

With the increasing tempo of data collection by a number of agencies at all levels of government, there is a need for an integrated system of handling water quality and water use data within the Region. Such a system which might be based on the existing Federal Water Pollution Control Administration STORET program will make possible better interchange of knowledge and eliminate duplication of studies. Such an integrated system would further be of great value in permitting the application of such techniques as mathematical modelling and systems analysis in the development of overall water quality management programs.

Regional Cooperation

A review of water quality problems and water needs within the Long Island Region points out the interrelationship throughout the entire area. There is a need for close coordination and water quality management to ensure that on-going and future programs consider not only the immediate locality but also the effects upon the Region as a whole.

Before comprehensive water management programs can be formulated, studies must be carried out to determine the appropriate legislative and institutional responsibilities needed to integrate planning programs for major drainage basins. Studies recommending the creation of regional authorities must ensure that the needs of the smaller basins are represented, weighed and/or integrated into the regional water management programs.

Legal Framework

To ensure that adequate water pollution control programs can be formulated and implemented, there is a need to evaluate existing legal mechanisms and institutional arrangements to determine their adequacy to deal with water quality problems on both a local and a regional basis. At the present time there is a lack of data on the adequacy of existing framework, as well as a lack of information on the interrelationships between various authorities and governmental agencies in dealing with the problem of resource management. In a number of localities there is a requirement for additional legislation to zone present and future shoreline developments.

Financial Arrangements

Investigations must be carried out to determine the amount of financial participation each basin entity (government and private) should produce to meet expenditures required for immediate and long range pollution control programs. The role of Federal, State, local and private bodies must be evaluated in terms of cost and benefits to give an indication of the economic impact of water pollution control programs and their effects upon the Region as a whole. Such problems as competition between various public works programs such as highways, education, and water pollution control must be evaluated to ensure that programs aimed at achieving water quality management receive a proportionate share of total public and private expenditures.

Miscellaneous Studies

In addition to the outline of studies listed above there is a need to survey a variety of other existing pollutional sources and potential problem areas.

V - RECENT PROGRESS IN POLLUTION CONTROL

INTERSTATE ACTION

The Interstate Sanitation Commission was created by compact between New York, New Jersey and Connecticut for the abatement of existing and control of future pollution in the waters of the Metropolitan New York Region and the Long Island Region. The Commission has established standards which assure that treatment facilities in the Region will meet Commission requirements. The Commission endeavors to convince municipalities and industries of the need for voluntary abatement before it takes legal measures.

During 1966, the Commission reported that four projects representing an expenditure of $1,319,000 were completed in Nassau County. The most important was the Secondary Treatment plant installed at Lawrence, N. Y. The Commission reported three other plants actively undergoing alteration and/or construction in Nassau County. Two treatment plants of the Great Neck Sewer District are being modernized, expanded and extended at a cost of $1,250,000. The third project, a ground water re-charge operation at Nassau County Sewage District #2 costs $513,000 and uses 400 gallons per minute of tertiary effluent to investigate the feasibility of injecting renovated water deep into an aquifer. This plant design was based on the results of an earlier pilot study.

Future projects cited by the Commission for corrective action are treatment facilities at the following locations or sewage districts: Cedarhurst, Glen Cove, Great Neck Village, Lawrence, Long Beach, Nassau County Districts No. 3 and No. 4, and Suffolk County Sewerage Districts No. 1,4,5,6,7 and 8.

NEW YORK STATE

In 1965 the State of New York completed a comprehensive survey of its pollution abatement needs. This survey showed that more than 100 municipalities provided no treatment, and an additional 43 communities provided inadequate treatment. This survey also indicated that the most important pollution control challenge in New York State is the need for control of industrial wastes.

In August 1965, the State Health Department adopted new treatment requirements which prescribe minimum treatment levels for each class of water. The policy also requires that wastes must be treated on the basis of the highest downstream classification and not merely the classification of the immediate receiving water. Under this policy treated wastes must meet the following requirements:

Classification	Minimum Required Treatment
AA	Tertiary Treatment and Chlorination
A & B	Secondary Treatment and Chlorination
C	Secondary Treatment
D	Primary Treatment

In November of 1965 New York State enacted a Pure Waters Act with an accompanying 1.7 billion dollar program for water pollution control. The Principal features of this Act included:

1. A one billion dollar fund to pre-finance Federal construction grant money so as to make possible total State and Federal grants of 60% of the cost of treatment plants, outfalls and interceptors.

2. Tax incentives to increase pollution control activities by industry.

3. Payment of one-third of the operation and maintenance costs of municipal plants providing adequate treatment.

4. Established an automated water quality monitoring network throughout the State.

5. Provides accelerated enforcement procedures.

6. Establishes a program to control waste discharges from State installations.

7. Promotes basic and applied research.

During the 1966 legislative session the State passed additional statutes to further the water pollution control program. These new laws included the following provisions:

1. Municipalities under orders by the State Health Department are denied the right of referendum on bond issues for the construction of treatment facilities.

2. Cities are permitted to anticipate future waste control needs in the purchase of land and in the construction of treatment plants, to provide capacity for future growth.

3. Bacteriological standards were set for waters used for potable water supply and bathing and for streams that traverse urbanized areas. This statute requires higher treatment efficiencies when coliform counts in the receiving water reach specified maxima.

4. Local authorities were given enforcement power to abate wastes from individual homes and small businesses.

5. Regulations were established to control pollutional discharges from boating.

6. Both municipalities and industries must maintain records on the quantity and quality of waste discharges and must make these records available to the Commissioner of Health. This law also prohibited the use of any existing or new outlet for waste discharge unless such use complies with all rules and regulations of the State Health Department.

7. An authorization for injunctive action when a violation of water pollution control law occurs.

8. Local financing laws were liberalized to encourage greater local initiative in construction of waste treatment facilities.

NASSAU-SUFFOLK REGIONAL PLANNING BOARD

According to the 1966 report of the Oceanographic Committee of the Nassau-Suffolk Regional Planning Board, the following steps have been taken by State and/or County authorities in the Region because of pollution to the marine environment:

1. Eleven beaches have been closed or refused permits for public bathing.

2. More than 10,000 acres have been closed to shellfishing.

3. A pilot project is underway to control some aspects of duck pollution.

4. The Mosquito Control authorities have suspended use of DDT in wet land areas.

5. Suffolk County is in the process of establishing a Sewer Authority.

In addition, contamination of several bays and harbors has been reduced by dredging operations which help improve circulation and remove settled pollutants.

NASSAU COUNTY

A $513,000 contract has been awarded for the construction of a 400 gallon per minute tertiary treatment plant in the East Rockaway area, which will use the secondary effluent from the Bay Park Sewage Treatment Plant. The tertiary treated effluent from this project will help the County to determine the feasibility of large scale injection of renovated water to halt the salt-water contamination of the principal fresh water aquifer.

The total amount of water under Long Island is estimated at 20 trillion gallons. It is estimated that 27 million gallons of potable water a day are being lost because of salt-water intrusion and underflow. About 75 million gallons a day are lost through sanitary sewers. Per capita consumption in Nassau County averages about 105 gallons a day.

SUFFOLK COUNTY

Suffolk County's proposed First Sewerage District was rejected by almost 6 to 1 in a referendum voted upon in February 1967, despite warning by authorities that the County's drinking water was being dangerously polluted by cesspool water. The proposed District would have served about one third of the County's population, and was planned as the keystone of a county wide system costing more than $1 billion.

FEDERAL

Federal Water Pollution Control Administration personnel and resources have been employed in the investigation and abatement of pollution in the Long Island Region.

Two Federal grants received by Nassau County in connection with the new East Rockaway - Bay Park Sewage Treatment Plant will help to determine the feasibility of large scale injection of renovated water to halt salt-water contamination of the fresh water supply. The project is of national importance. In addition to the activity of the construction grants program, a number of laboratory and field studies have been carried out.

In September 1966 a report was issued in conjunction with a conference held on "Pollution of the Navigable Waters of Moriches Bay and Eastern Section of Great South Bay, Long Island, New York". The report indicated that the waters of Moriches Bay and the Eastern Section of Great South Bay were polluted by bacteria, suspended solids and nutrients, as a result of waste discharges from numerous duck

farms, municipal and domestic sewerage systems, industrial operations, recreational boats, and land drainage. As the result of bacterial contamination of the overlying waters, the Report stated that substantial areas in Moriches and Great South Bays have been closed by New York State Authorities to the harvesting of shellfish, resulting in an economic loss of more than $2,500,000 annually. At this and subsequent conferences, the amount and degree of treatment required to abate pollution from duck farms were decided upon and the following time schedules were established.

All the duck farms in the conference area:

(a) On or before August 1, 1967 shall submit to the New York State Department of Health final construction plans for adequate waste treatment facilities to remove at least 85 percent of the suspended solids and at least 85 percent of the biochemical oxygen demand, and a substantial portion of the phosphates, and facilities for disinfecting such wastes.

(b) On or before November 1, 1967, initiate construction of such facilities.

(c) On or before April 30, 1968, complete construction of such facilities.

(d) Thereafter maintain and operate such facilities in such manner that they at all times meet the above performance criteria.

It was also agreed that the maximum amount of domestic wastes shall be collected in sewers and given secondary treatment plus chlorination of the effluent and that regional or area-wide drainage collection systems and treatment are necessary for the protection of the waters of Moriches and Great South Bay for all beneficial purposes.

In 1962, a series of dye experiments to determine the pattern of water circulation in the western portion of Great South Bay was conducted and evaluated by the Public Health Service, the predecessor to the Federal Water Pollution Control Administration.

VI - BACKGROUND FOR RECOMMENDATIONS

KNOWN WATER QUALITY PROBLEMS

To determine the extent that municipal, industrial and other waste discharges have affected the quality and use of the Long Island Region waters, an evaluation was made, based on existing data from limited Project field surveys, State reports and records, and the New England-New York Inter-Agency Committee Report. Analytical data were compared with parameter values regarded as acceptable for such water uses as water supply, recreational bathing and boating, and sport fishing. The following streams and water bodies, arranged by river basin, were found to have water quality below that required for the expected water uses. Specific problems and those areas requiring further study are also indicated.

Atlantic Ocean Basin

Jamaica Bay

A small portion of Jamaica Bay falls within the Long Island Region. All of these waters, which include parts of Head of Bay Basin and Head of Bay, are in a polluted condition. Three municipal and two industrial facilities located in the Long Island Region discharge wastewaters into the Bay. The Bay also receives the combined sewer overflows from New York City. Poor hydrographic conditions further complicate the water quality problem in this area. Recreational boating, dredging activities and sludge deposits also contribute to the degradation of these waters. Further studies are needed in these areas.

Reynolds Channel and Hempstead Bay

Five industrial and four municipal treatment facilities are discharging wastes into Hempstead Bay and Reynolds Channel. These discharges contribute to the serious degradation of these waters. At least three industries are suspected of discharging toxic chemicals with their wastewater. Dredging activities and recreational boating are also suspected of contributing to the poor quality of these waters. Additional information is needed to determine all of the causes of pollution.

Middle Bay, East Bay and Sloop Channel

Middle Bay, East Bay and Sloop Channel, which empty into the Atlantic Ocean through Jones Inlet, are extensively used for recreation and are generally of good quality. However, there are localized

pollution problems near some residential areas with septic tank systems and near some marinas. Wastewater discharges from four industrial and two municipal secondary treatment facilities may also be contributing to these isolated problem areas. Additional investigation is needed to determine the significance of each of these factors.

Great South Bay

There are two municipal sewage treatment plants and 16 industrial facilities which discharge wastes into Great South Bay. Generally, the central and western portions of the Bay, including South Oyster Bay are of good quality, although there are problems on some of the tributary waters. However, Patchogue Bay and Bellport Bay in the eastern section of the Bay are being seriously polluted by the discharges of the obsolete primary treatment plant at Patchogue, septic tank discharges and seepage, and three duck farm operations. Industrial wastewater discharges, particularly those which contain toxic chemicals, also contribute to the degradation of these waters.

High bacterial levels and high concentrations of nutrients and suspended solids have been recorded throughout these waters. As a result, extensive areas have been closed to the harvesting of shellfish. In addition, objectionable odors, and excessive growths of algae and other aquatic plants reduce the use of these waters for recreational and other associated activities. Other factors that may be contributing to the poor water quality of these waters are agricultural runoff, recreational boating, dredging activities, sludge deposits, and poor hydrographic conditions. Further study is needed to determine the extent of pollution by these sources.

Moriches Bay

The discharges of wastes from at least 30 duck farms, one poultry processing plant and numerous individual septic tank systems have resulted in the serious pollution of the navigable waters of Moriches Bay. As a result, high bacterial levels and high nutrient suspended and dissolved solids concentrations have decreased the esthetic enjoyment, produced offensive odors, decreased productivity of shell- and finfish and other aquatic life, and interfered with recreational uses of these waters. Recreational boating, agricultural land runoff, sludge deposits, dredging operations, and poor circulation of Bay waters may also be contributing to the water quality degradation of the waters. Additional study in these areas is needed.

Long Island Sound Basin

Little Neck Bay

Little Neck Bay waters within the Long Island Region receive the wastewater discharge from one municipal plant and two industrial

facilities. The significant carry-over of pollutional material from the East River, however, makes it difficult to determine to what extent these discharges affect the water quality of the Bay. Additional study of this complex problem is needed.

Manhasset Bay

At present, Manhasset Bay is closed to the harvest of shellfish. These waters receive the discharges from three municipal secondary sewage treatment plants. Carry-over pollution from the East River and discharges from recreational boating are believed to be the main causes of pollution. Additional studies are needed.

Hempstead Harbor

Hempstead Harbor receives the discharges from two municipal plants and ten industries. These wastewater discharges have resulted in the closure of portions of these waters to shellfish harvesting and restrict recreational activities in the area.

Oyster Bay

The waters of Oyster Bay are relatively free of pollution. They receive effluent from a secondary treatment plant, and one industry. Additional information is needed to fully evaluate the condition of these waters.

Huntington Harbor

The southern portion of Huntington Harbor is presently polluted. The wastewater discharges from one municipal secondary sewage plant and one industry, which releases toxic chemicals, are the major sources of pollutional material. Other suspected sources of pollution are septic tank seepage and and the discharges from recreational boating. Additional field and analytical work must be performed to determine the extent of pollution of these waters by all of these sources.

Northport Harbor

Northport Harbor is presently being polluted by the discharges from the obsolete and overloaded primary treatment plant at Northport and two industrial facilities. Recreational boating activities and septic tank seepage contribute further to this pollution. Additional study is needed to determine to what extent each of these waste sources affect the waters of the Harbor.

Smithtown Bay

The waters of Smithtown Bay receive the discharge from two industries and recreational boaters. Additional study is needed to assess

their effects more accurately.

Port Jefferson Harbor

A large portion of Port Jefferson Harbor waters is polluted. A major source of pollution is the obsolete primary treatment plant at Port Jefferson. Two industrial facilities also discharge wastes into these waters. Other sources of pollution are septic tank seepage and boating discharges. Further studies are needed in these areas.

Flanders Bay

Limited information indicates that these waters are seriously polluted. Major causes of this pollution are two municipal treatment plants and three industrial waste discharges. The operation of approximately 21 duck farms on the Peconic River, a major tributary to these waters, is another major source of pollution. Seepage from septic tank systems and recreational boating may also be contributing to the degradation of these waters. These areas need further study.

Eastern Long Island

The waters in this area, including Shelter Island Sound, Greenport, Sag Harbor, Block Island Sound, Gardiners Bay, the Peconic Bays and their connecting waterways, are not extensively polluted. There are, however, two municipal waste sources and two industrial facilities expelling wastes into these waters, causing localized pollution problems. The untreated wastes from the Village of Sag Harbor is the major source of municipal pollutional material. One industrial facility is suspected of discharging liquid wastes containing toxic chemicals. Other suspected sources of pollution are seepage from individual stores and homes fronting the waters of the area, and recreational boating.

Long Island Sound

Except for the western portion, which receives pollutional material from the East River, these waters are generally of good quality. There are three municipal sewage plants and three industrial outfalls which discharge waste along the shores. There may also be local pollution problems associated with recreational boating facilities and inefficient septic tanks in built-up areas. Additional field and analytical work is needed to determine the extent these waste sources are affecting the water quality of Long Island Sound.

GROUND WATER AQUIFERS

There are 77 industrial and 11 Federal installations discharging wastes into the ground water aquifers of the Region. The extensive use of individual septic tank systems throughout the Region contributes further wastes to the ground water supply via percolation and seepage. These discharges degrade the ground water and in some cases have resulted in the abandonment of these waters for water supply purposes.

The industrial wastes of major concern to the degradation of these ground waters are produced by the 37 plating operations which release acids, copper, zinc, nickel, cadmium, chromium and cyanides. Other industries add phenols and dyes to the ground water aquifers. In addition, laundry wastes from at least 60 launderettes are discharged into the ground.

Leaching cesspools and septic tanks discharge substantial quantities of bacteria and the chemical substances normally present in sewage into groundwater. Synthetic detergents have also been added to these waters through the use of individual systems. Other sources of pollution which require more detailed field and analytical work are leakage from sanitary landfill and ash dumping operations and salt water intrusion.

STREAM CATEGORIZATION

To highlight the extent of existing information on present water quality of the various streams, inlets and bays within the Region, a system of categorization was used to summarize existing data. This system assigns to each water body one or more of the following categories:

Category I	-	No water quality problems;
Category II	-	Water quality problems are known and solutions readily identified;
Category III	-	Water quality problems are indicated by available data, but causes and/or solutions are unknown;
Category IV	-	Insufficient data to indicate presence or absence of problems.

The categories assigned to the receiving waters, as shown in Table VI-1, point out that little or no information is available as to the extent of pollution other than that from certain municipal and industrial waste discharges. Where available data indicate a need for increased treatment at existing plants, or for construction of new facilities, a Category II was assigned. In many cases, however, lack of information on other sources of pollution, or the seriousness of the problem, resulted in the additional assignment of Category III and/or IV.

Table VI-1 also indicates suspected sources and problems for the various streams. These data, which are based on limited analytical work, combined with knowledge of the particular water body, indicate a need for further studies to determine the extent and control

of such pollutional problems as:

1. Septic Tanks and Cesspools
2. Dredging
3. Sanitary Landfill
4. Duck Farms
5. Bottom Deposits
6. Eutrophication and Aquatic Vegetation
7. Pesticides
8. Recreational and Commercial Navigation
9. Ocean Disposal
10. Salt Intrusion

Since the categories have been assigned on the basis of present knowledge and conditions, continued surveillance should be undertaken to identify new problems as they arise.

MUNICIPAL, INSTITUTIONAL, FEDERAL AND INDUSTRIAL POLLUTION SOURCES

Data have been collected for 26 municipal and institutional waste sources and for 13 Federal waste systems that discharge into the inter- and intrastate waters of the Long Island Region. These plants can treat the wastes of an estimated 878,600 persons of which about 822,200 persons are in Nassau County and 56,400 in Suffolk County. It is estimated that municipal waste treatment facilities serve less than half of the resident population of Nassau County and not more than seven percent of Suffolk County's residents. This points up the fact that the major wastewater problem in the Region is the replacement of hundreds-of-thousands of individual septic tanks or cesspool systems with adequate municipal collection and treatment facilities.

Ten of the existing municipal facilities discharge into surface waters that drain to the Atlantic Ocean basin and 16 discharge into the Long Island Sound basin. Federal installations are scattered throughout the Region, with the majority discharging into the ground via septic tanks or cesspools.

There are 133 industrial operations discharging wastes in the Region. These operations include metal finishing and plating activities, electronic manufacturing, aircraft manufacturing and metal works, and manufacturing. Other important industries are dairy, pharmaceutical, toilet preparations, laundries, textile, highway and paving materials and beverages.

Of the 172 municipal, Federal and industrial facilities, no immediate corrective construction is required for 18 municipal and institutional, 13 or all of the Federal, and 44 industrial waste sources. The remaining 97 waste sources provide no treatment or inadequate treatment.

Table VI-2 is a summary of the information regarding all known waste sources. Data for this table were obtained from Project reports and records, FWPCA Municipal Waste Inventory of 1962 and records of the Nassau and Suffolk County Health Departments. Given in Table VI-2 is the number of facilities that discharge into interstate waters, which are defined as water bodies that cross or form international or state boundaries, the tidal portions of rivers and streams flowing into coastal waters and the coastal waters themselves. Included in the interstate total is the number located on intrastate waters that adversely affect the quality of interstate waters. The table also lists the number of treatment facilities located on intrastate waters, which are defined as those rivers, streams or lakes situated entirely within and not adjacent to state boundaries. Those waste sources adversely affecting the ground waters of the Region were also considered in the intrastate category.

Municipal and Institutional Waste Discharges

There are eight municipal waste sources discharging into the Region's interstate waters which are in need of corrective construction activity. These sources handle the waste load of approximately 24,000 persons, only one percent of the total Region's 1960 population. One plant is located in Nassau County and seven other systems in Suffolk. Project data disclose that seven of these eight waste sources provide primary treatment for an estimated 24,000 persons. The remaining source discharges the raw wastes of at least 200 persons. There are no inadequate municipal discharges into intrastate waters.

Industrial Waste Discharges

Of the 89 industrial sources found to be in need of corrective action, 36 are on interstate waters. Seventeen of these plants discharge into the Atlantic Ocean waters, and the remaining 19 discharge wastewaters into Long Island Sound. On an estimated population equivalent basis, these sources represent the wastes of 85,000 persons. Thirteen industries also discharge toxic substances in their respective wastewaters. The majority of these are involved in small metal plating and finishing operations.

There are 53 industrial waste sources discharging into the intrastate waters of the Region. All of these wastewater discharges are released to the ground with ultimate disposal into the aquifers. The majority of the plants (32) are manufacturing operations with plating facilities and discharge toxic and/or oil substances with

their effluents. The remaining 21 industrial facilities include such operations as dairy, pharmaceuticals, textiles, soft drinks, candy and confectionery, and cosmetics and account for an organic load estimated to be equivalent to 31,000 persons.

OTHER POLLUTION PROBLEMS

Septic Tanks and Cesspools

Within the Long Island Region, more than 1,650,000 persons occupying 450,000 housing units, or over 75 percent of the total 1960 resident population of the Region, dispose of domestic wastes by individual septic tanks and cesspools. In 1960, 96 municipalities with populations between 2,500 and 66,000 were dependent at least in part on septic tanks and cesspools. Sixyt-four of these municipalities are in Nassau County. In addition, an unknown number of business establishments also discharge wastes into individual systems. When the overflow from septic tanks is discharged directly into surface waters, significant bacterial pollution results.

In many portions of the Region where the soil is porous and the ground water level high, the wastes from such systems contaminate and become a part of the ground water flow. This ground water contamination has been demonstrated by pollution of many wells in the Region. In 1963, for example, the Suffolk County Health Department estimated that 35 percent of the individual wells in the Center Moriches Area were polluted.

In non-porous soils, tile fields often fail to handle septic tank overflows in a satisfactory manner, resulting in the overflow of effluent in backyards, streets and finally as surface runoff.

Septic tank discharges which become a part of ground water flow are often injected into adjoining surface waters. Previous studies of ground water flow in the area of Brookhaven, Suffolk County, have shown a general southwesterly movement of ground water. This movement through the soil although often reducing bacterial contamination, and suspended solids, transports nutrient materials such as nitrogen and phosphates which can trigger algae blooms and contribute to eutrophication.

In addition to bacteria and nutrients, there are other substances which are ineffectively treated by cesspools and septic tanks and which have been found entering subsurface aquifers. In this region the increased use of detergents in the home and commercial laundries has caused high concentrations of surfactants in the sewage which, in unsewered areas, has caused high concentrations in the ground water

which impart an objectionable taste and cause foaming in water supply wells. Concentrations of surfactants have exceeded the U. S. Public Health Drinking Water Standards (maximum levels of 0.5 mg/l) at some locations throughout the Region. To prevent such problems will require detailed investigations of the extent and location of individual waste disposal systems as well as geology of the underlying soil.

Dredging

Additional degradation of the water quality within the Long Island Region can occur as a result of extensive dredging activities. Dredging authorized or carried out by the Corps of Engineers for the improvement and/or maintenance of navigation channels and for construction or fill materials can have deleterious effects on resources in the area of activity as well as the area of disposal. The disturbance of the bottom by dredges causes a re-suspension of accumulated organic sludges and silt which results in a greatly increased BOD. Material resuspended by dredging can also seriously disturb the shellfish and finfish resources. Uncontrolled dredging can alter flow patterns and result in the formation of large pot holes whose bottoms are deeper than and do not have free connection with other waterways.

Disposal of dredged material can create serious pollutional problems, if the return of spoil material back to the water and the creation of new public health hazards is not prevented. Such operations can destroy the flats and marshes which serve as a nursery for fish and as a refuge for wildlife.

Dredging within the Region may also affect the salt-fresh water balance and cause salt water intrusion of the ground waters used for water supply.

Guidelines should be devised to coordinate and facilitate the mutual interests of all Federal, State, and local resource agencies concerned with dredge and spoil areas. Procedures must be established to ensure that dredging projects will not create water pollution problems, public health hazards or destroy the natural resources.

Sanitary Landfill

There are various sanitary landfill operations scattered throughout the Region which are used for the disposal of refuse, garbage, incinerator residue and sludge from public sewage treatment plants. The pumpings from individual septic tank systems may also be discharged into these landfill operations.

These landfill operations may be adversely affecting the ground and surface waters of the Region. The growing population and the abandonment of private sewage facilities in favor of disposal through public collection and treatment facilities and their corresponding increase in refuse, garbage, sludge, etc., further point to the need for investigation and comprehensive planning of sanitary landfill operations in the Region.

Duck Farms

There are approximately 40 duck farms, all of which are in Suffolk County, operating in the Region. The total production from these farms during the March through November growing season is estimated to be 4,350,000 ducks. In general, many of the duck growing farms are located along the banks of the tributary streams to Long Island Sound and use these streams for watering purposes. Holding pens and dikes are built across the stream or other body of water, and the ducks are allowed to move freely between land and water, depositing their wastes either directly into the stream or on the banks. During rainfall, accumulated organic matter is washed into the stream. Using 20 lbs of BOD per day per 1,000 ducks, the total potential annual duck waste from all farms amounts to approximately 16,000 lbs of BOD and is equivalent to a population of 92,000 persons. In addition, these waste discharges contribute to bacterial contamination, unsightly appearance, production of objectionable odors, and excessive growths of algae and other aquatic plants. Such conditions limit the use of the waters of the Region for shellfish harvesting, recreational bathing and boating, and esthetic enjoyment. The navigable waters of Moriches Bay and the easterly end of Great South Bay have been seriously affected by duck farming wastes.

Bottom Deposits

The continual discharge of duck farm wastes and inadequately treated domestic and industrial wastewaters have resulted in the formation of extensive sludge deposits throughout the Long Island Region. The highly organic bottom deposits exert an additional oxygen demand on the Region's waters and destroy and/or inhibit the desirable growth of aquatic and marine organisms. Decomposition of these organic materials can also produce obnoxious hydrogen sulfide gas which breaks loose masses of bottom sludge and lifts them to the surface where they form unsightly gray or black odorous clumps and rafts. These possible contributors to the water quality problems of the Region must be investigated further.

Eutrophication and Aquatic Vegetation

Many waters in the Long Island Region are sufficiently rich in both phosphorus and nitrogen to support prolific growths of aquatic weeds and algae. Such growths may interfere with pleasure boating

bathing and other recreational water use. In addition, the growth of undesirable minute suspended algae have significantly reduced the quality and production of the shellfish resources in the Region.

Vegetation that is cut free by boats or by heavy seas also contributes to the pollution problems. Heavy mats of this vegetation can be cast upon the shore and decompose, producing objectionable odors.

The major sources of nutrients are duck farm wastes, raw and treated municipal wastes, septic tank and cesspool overflow and seepage, direct discharges from recreational boating, and runoff from agricultural areas. The problem is further complicated by the restricted water movement and shallow waters in many of the bays, coves, and inlets in the Region. Data available indicate that nutrient pollution has created serious water quality problems in Moriches, Bellport and Shinnecock Bays and the entire Great South Bay.

Much of the nutrient pollution has been attributed to the duck farming operations located on the tributary streams to these waters. The complete treatment of these wastes before discharge into the bays can significantly improve the present condition. Other causes and control methods that can be used to prevent interference with water use should be the subject of further study.

Pesticides

Another source of pollution results from the use of agricultural chemicals associated with the intense truck farming activities in the Long Island Region. Large amounts of chlorinated hydrocarbons and other pesticides are spread over the surface of the land. During periods of rainfall, excess chemicals are washed into the surface waters or percolate into the subsurface aquifers. Hence, much of these materials eventually enter the bays of the Region. Recent measurements in the soils of the marshes of the mouth of Carmens River on Great South Bay, and in various organisms from that area indicate high residual DDT concentrations. In many cases these concentrations approached those in organisms known to have died of DDT poisoning. Some long-term studies have shown a substantial reduction during the past decade in local fauna known to be sensitive to DDT.

The extent of this problem and the methods for its control are not fully understood and should be the subject of further study and research.

Recreational and Commercial Navigation

Both recreational and commercial navigation are important water uses throughout the Long Island Region. Recreational boating can constitute a significant source of pollution as a result of the discharge of human fecal matter, litter, motor exhaust and oil. The

discharge of untreated human feces from the many boats in the Region represents a significant health hazard, which is particularly acute in crowded marinas where people virtually live aboard ships. The State of New York has recently established regulations governing the disposal of wastewater from watercraft, but treatment devices such as macerator-chlorinators, incinerator toilets, and holding tanks are not generally in use. In the case of holding tanks, there is a lack of adequate shoreside facilities to receive and treat the waste.

The rapid growth of pleasure boating has resulted in an appreciable increase in dumping of litter, including such materials as plastic food wrap, and glass, metal and cardboard containers. Much of this material floats and is carried onto beaches and other areas, resulting in destruction of the aesthetic value.

The exhaust from outboard and certain inboard motors is discharged directly into the water, resulting in contamination of the water by hydrocarbon residues. In restricted waters, such as the numerous coves and bays found along the shores of this Region, the concentration of these chemicals could increase to levels detrimental to aquatic life.

Oil pollution can occur as the result of careless operation of recreational boats, but due to the volume of oil involved, this phase of the problem is usually limited to those areas where large numbers of boats are concentrated, such as marinas. Of much greater significance is the problem of oil pollution by commercial navigation in Long Island Sound and the New York Bight.

The discharge of oil by commercial traffic may be the result of bilge pumping or physical damage to a tanker or barge, as well as spillages which can occur during ship-to-shore transfer. At the present time this problem is confined to beaches fronting the ocean and sound.

Ocean Disposal

The ocean area adjacent to the Long Island Region, generally known as the New York Bight, has long been used as a site for the disposal of rocks, mud, dredgings, sewage sludge and industrial wastes. Long Island Sound is also used as a dump area. The major areas of the New York Bight which are now used as dumping grounds are shown in the map following the Appendices. Table VI-3 summarizes the total volume of wastes dumped at these sites for the years 1965 and 1966.

A preliminary appraisal indicates that the sewage sludge and waste acid may have the most significant pollutional effect on the ocean waters. Consistent criticism has been directed at the National Lead Company (Sayreville, N. J.) which dumps large quantities of acid

wastes containing ferrous sulfate, sulfuric acid and trace materials. Although scientific studies have been conducted in the acid dump area, no conclusive evidence as yet is available to indicate the extent these substances are affecting fish and other marine organisms, as well as migration and other related factors. However, some fishermen, based upon their years of experience and personal observation, report that since the acid dumping began in 1948, fishing in the area has declined.

The discharge of sewage sludge originating in New York City and other municipalities has not generally been the subject of complaint by local fishermen. There has been some limited investigation in this area. A preliminary study conducted by the Northeast Shellfish Sanitation Research Center reported a rapid reduction in bacteria in sewage sludge after it was discharged into the sea. The Center found that the MPN in the sludge before dumping was high, and decreased rapidly with distance from the center of the dump area. Coliform counts were found to be insignificant six miles from the dump. The study also found indications of considerable buildup of sediments on the ocean bottom.

The extent to which the disposal of the acid wastes and sewage sludge may be interfering with the beneficial use of the ocean waters of the New York Bight is not completely known. A comprehensive evaluation is necessary to accurately determine the effects of these pollutional sources on the ocean resource and fisheries. In addition, studies are necessary to determine whether the disposal of cellar dirt and dredged materials are adversely affecting the ecology of the ocean waters. The importance of river-borne wastes flowing into the Bight should also be determined.

In addition, Nassau County is considering plans to construct a large ocean outfall for the disposal of treated industrial and domestic wastes in the New York Bight. Some studies have been conducted, but more are needed, particularly on the question of ocean assimilation of digested sludge.

The disposal of radioactive wastes in the waters of the Bight is another area needing investigation. The increasing demand for ocean disposal of a variety of wastes and their possible cumulative effect on fishing and other legitimate water uses further emphasizes a need for comprehensive study in this area.

Salt Intrusion

Salt water encroachment into ground water aquifers is a slow phenomena, generally measured in a few hundreds of feet per year. There has been some salt water intrusion of the aquifers in northwestern and southwestern Nassau County. To emphasize the potential seriousness of the problem, in Brooklyn, overpumping of ground water did not cause sea water intrusion for many years. However, once salt

water intrusion occurred all of the public water supplies were abandoned. Suffice it to recall that the entire public water supply in the Region is obtained from ground water sources. Continued investigation and study will be necessary to define the trends and to anticipate critical situations. Particular attention must be given to the effect of public sewerage facilities which will discharge wastes to the sea where it was formerly returned to the ground water through cesspools. Experiments involving aquifer recharge with treated waste water are now being conducted by the Counties.

TABLE VI-1

LONG ISLAND REGION
WATER QUALITY PROBLEM AREAS

Name of Water	Number of Pollution Discharges: Municipal & Federal	Number of Pollution Discharges: Industrial	Category	Problem
Atlantic Ocean Basin				
Atlantic Ocean Basin Total	12	28		
Atlantic Ocean	1	0	IV	Insufficient data
Jamaica Bay	3	2	II III	Mun.-Ind. Waste disc. Hydrographic cond., sludge deposits, rec. boating, dredging activities
Reynolds Channel & Hempstead Bay	4	5	III	Mun.-Ind. Waste disc., dredging activities, and rec. boating.
Middle Bay	1	3	III	Mun.-Ind. Waste disc., rec. boating, marinas, septic tank seepage
East Bay	0	1	III	Ind. Waste disc., rec. boating, marinas, septic tank seepage
Sloop Channel	1	0	III	Mun. Waste disc., rec. boating, marinas, septic tank seepage
Great South Bay	2	16	II III	Mun.-Ind. Waste disc., duck farm wastes, and septic tank seepage Agri. runoff, rec. boating, poor hydrographic cond., dredging activities, sludge buildup

TABLE VI-1

LONG ISLAND REGION
WATER QUALITY PROBLEM AREAS (Cont'd)

Name of Water	Number of Pollution Discharges: Municipal & Federal	Number of Pollution Discharges: Industrial	Category	Problem
Atlantic Ocean Basin (Cont'd)				
Moriches Bay	0	1	II	Duck farm wastes, Ind. Waste disc., septic tank seepage
			III	Rec. boating, agri. runoff, dredging operations, poor hydrographic cond., sludge deposits
Long Island Sound Basin				
Long Island Sound Basin Total	17	28		
Little Neck Bay -	1	2	III	Mun.-Ind. Waste disc. and pollutional intrusion from East River
Manhasset Bay	3	0	II	Mun. Waste disc.
			III	Carry-over of poll. from East River and rec. boating
Hempstead Harbor	2	10	II	Mun.-Ind. Waste disc.
Oyster Bay	1	1	III	Mun.-Ind. Waste disc. and other unknown disc.
Huntington Harbor	1	1	III	Mun.-Ind. Waste disc. Septic tank seepage and rec. boating

TABLE VI-1

LONG ISLAND REGION
WATER QUALITY PROBLEM AREAS (Cont'd)

Name of Water	Number of Pollution Discharges: Municipal & Federal	Number of Pollution Discharges: Industrial	Category	Problem
Long Island Sound Basin (Cont'd)				
Northport Harbor	1	2	II III	Mun.-Ind. Waste disc. Rec. boating and septic tank seepage
Smithtown Bay	0	2	III	Ind. Waste disc., and rec. boating
Port Jefferson Harbor	1	2	II III	Mun.-Ind. Waste disc. Septic tank seepage and boating activities
Flanders Bay	2	3	II III	Mun.-Ind. Waste disc., duck farm wastes Septic tank seepage and Rec. boating
Eastern Long Island	2	2	II III	Mun.-Ind. Waste disc. Septic tank seepage and Rec. boating
Long Island Sound	3	3	III	Mun.-Ind. Waste disc., Septic tank seepage and Rec. boating
Subsurface Drainage				
Ground Water Aquifers	11	77	II III	Ind. Waste disc. Septic tank seepage San. landfill leekage, salt intrusion
GRAND TOTALS	40	133		

TABLE VI-2

WASTE SOURCES IN LONG ISLAND REGION
SUMMARY

INTERSTATE WATERS

Municipal and Institutional		Federal		Industrial a/		Total	
No.	Pop. Served	No.	Pop. Served	No.	Pop. Served	No.	Pop. Served
26	868,090	6	5,500	56	108,750	88	982,340

INTRASTATE WATERS

		7	5,050	77	53,106	84	58,156

TOTAL INTER- AND INTRASTATE WATERS

26	868,090	13	10,550	133	161,856	172	1,040,496

a/ Population served for industrial sources is the population equivalent on BOD basis.

TABLE VI-3

LONG ISLAND DUCK FARMS [1]

FARM NAME	ADDRESS	SIZE [2]
Tributary to Great South Bay		
Gallo Duck Farm	E. Patchogue	Large
Leszkowicz Duck Farm	Brook Haven	Large
Carmens River & Duck Farm	Brook Haven	Large
Tributary to Moriches Bay		
Swift Stream Duck Farm	Moriches	Medium
De Piazzy Duck Farm	Moriches	Medium
Ben Jurgielwicz Duck Farm	Moriches	Large
John Borak	Moriches	Large
Hallock Brookside Farm	Center Moriches	Large
Forge River Duck Farm	Center Moriches	Medium
Harry A. Smith	E. Moriches	Medium
Robert H. Smith	E. Moriches	Medium
Stanley Chornoma	E. Moriches	Medium
Chi-Dux Duck Farm	E. Moriches	Medium
Joseph Podloski	E. Moriches	Medium
Charles Vigliotta & Sons	E. Moriches	Large
John Romanowski	E. Moriches	Medium
Adam Kanas	E. Moriches	Medium
Breezy Acres	E. Moriches	Medium
Zygmunt Babinski	East Port	Medium
C. W. Massey & Son	East Port	Medium
Big Seatuck Duck Farm	East Port	Medium
Peter Kostuk & Son	East Port	Large
Emory Tuttle Duck Farm	East Port	Medium
Spring Water Duck Farm	East Port	Medium
Anna Pacholk	Speonk	Medium
Leroy Wilcox	Speonk	Medium
C & R Duck Farm	Speonk	Large

TABLE VI-3

LONG ISLAND DUCK FARMS [1] (Cont'd)

FARM NAME	ADDRESS	SIZE [2]
Tributary to Flanders Bay		
Harold T. Hubbard	Riverhead	Medium
H. F. Corwin & Son	Aquebogue	Large
Schubert Duck Farm	Riverhead	Medium
William G. Hubbard & Son	Riverhead	Medium
J. Wesley Warner	Riverhead	Medium
Trout Brook Duck Farm	Riverhead	Small
J. P. Celic's Broad Cove Duck Farm	Riverhead	Large
Bridgeview Duck Farm	Riverhead	Medium
Olin F. Warner	Calverton	Medium
Carmine Bruno	Riverhead	Medium
Mecox Bay Poultry Farm	Watermill	Large
Stanley Ozeka		Small

1/ A few of these farms will cease operation in the near future.

2/ Number of ducks produced annually for market:

Small = up to 50,000

Medium = 50,000 - 100,000

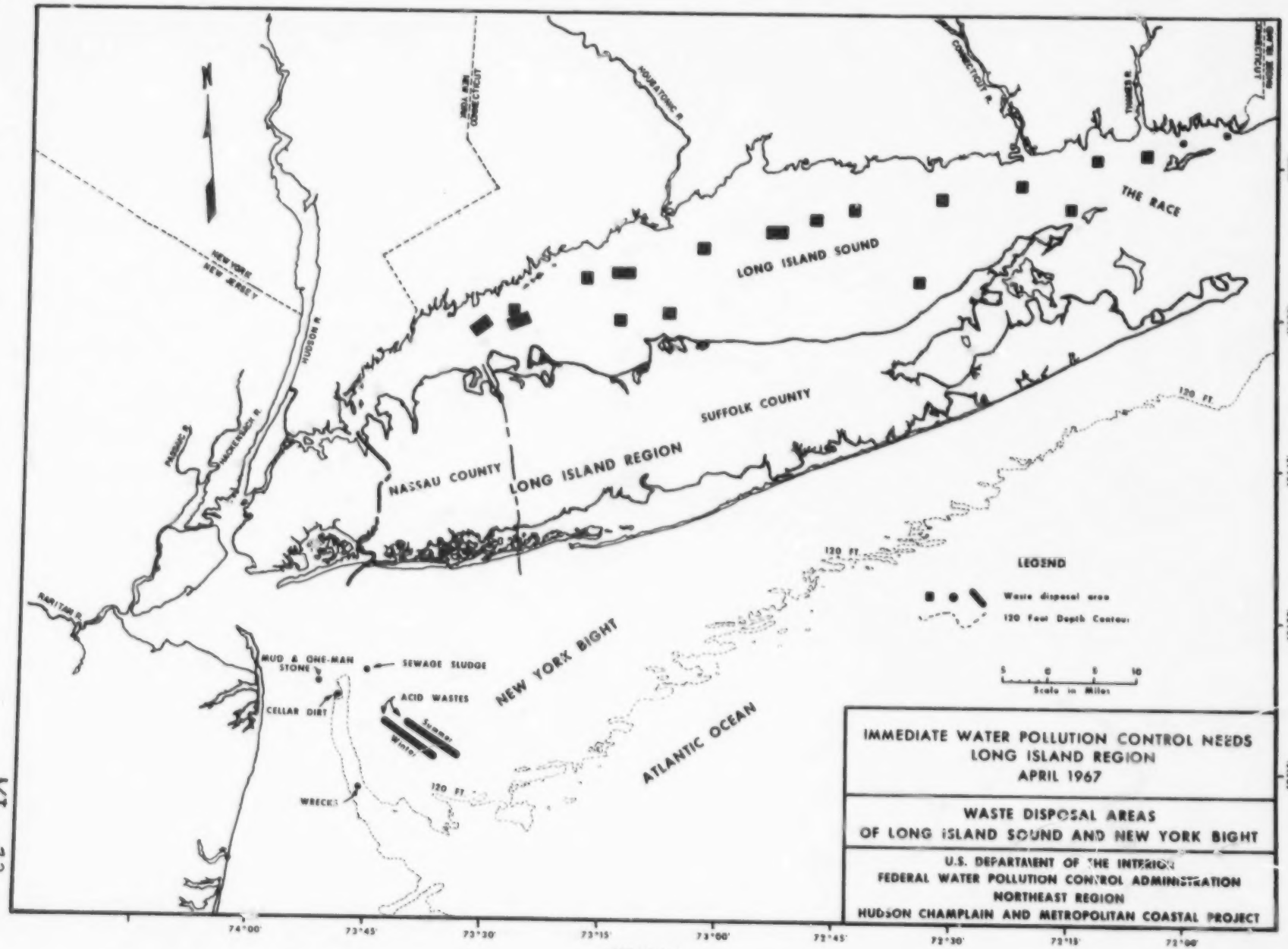
Large = over 100,000

Table VI-4

TOTAL VOLUME OF SEVERAL WASTES
DUMPED IN THE NEW YORK BIGHT
(cubic yards)

Year	Waste Acid	Sewage Sludge	Gov't Dredging	Cellar Dirt	Mud & Steam Ashes
1965	2,589,519	3,417,318	3,322,183	851,575	2,109,508
1966	2,854,646	4,202,004	3,772,847	816,794	3,939,187
2 Year Total	5,444,165	7,619,322	7,095,030	1,668,369	6,048,695

Source: U. S. Army Corps of Engineers.



IMMEDIATE WATER POLLUTION CONTROL NEEDS
LONG ISLAND REGION
APRIL 1967

WASTE DISPOSAL AREAS
OF LONG ISLAND SOUND AND NEW YORK BIGHT

U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
NORTHEAST REGION
HUDSON CHAMPLAIN AND METROPOLITAN COASTAL PROJECT

FIGURE 1

VII, 22

VII - DESCRIPTION OF THE REGION

LOCATION

The Long Island Region is made up of Nassau and Suffolk Counties in New York State and is bounded on the west by the Queens County boundary line, by Long Island Sound on the north, and by the Atlantic Ocean on the south and east. The land area of the two counties is approximately 1,200 square miles. The area is about 100 miles long and 40 miles wide at its widest point.

GEOLOGY

The entire Region lies within the Atlantic Coastal Plain, which consists of unconsolidated deposits of sand, gravel, and clay on a hard bedrock surface. The rock floor tilts downward in a southeasterly direction from close to the surface on the north to depths of some 2,100 feet below sea level on the south shore. Surface material is chiefly glacial debris of low relief.

HYDROGRAPHY

Long Island has an average annual precipitation of 42 inches per year with about 3.5 inches falling each month. Approximately half of the precipitation is lost by evaporation and stream flow. Surface waters in the Region eventually drain to the Atlantic Ocean either directly or via Long Island Sound or the other estuaries. The remainder becomes part of the groundwater reservoir, which supplies all of the Region's domestic and industrial needs.

The estuarine waters in the area include Long Island Sound, the bar-built estuaries along Long Island's south shore and the subestuaries of the tributary rivers. Long Island Sound is about 90 miles long, has a maximum width of about 15 miles, and averages about 60 feet in depth. Maximum depths are about 300 feet in the eastern basin and about 100 feet in the central and western basins. The estuary may be considered partially stratified. Surface tidal currents may exceed five knots in the Race and 2½ knots in the eastern basin, but are less than one knot elsewhere with the exception of local currents of one and a half knots near certain harbors and promontories. The net surface flow is to the east, while the deep flow tends to be westerly. Tidal interchange is equivalent to about 8.5 percent of the Sound's mean low water volume and the annual freshwater inflow is about 35 percent. Surface temperatures range from 3 to 19° C in the eastern end of the Sound and 0 to 23° C in the western. The total normal salinity range is about 23 to 31 parts per thousand, with an east-west salinity gradient of some 5 ppt. Riley (1955) feels that some 1,100 cubic meters per second enter the Sound from the East River

(about four times the total surface drainage in the summer). Three-quarters of the river water enters the east portion of the Sound. During periods of high flow it forms a distinct surface layer, but affects only a small portion of the estuary because it enters so near the Race. In general, tidal mixing is strong enough to prevent the formation of a strong seasonal thermocline. Dissolved oxygen concentrations in the summer are about 40 percent of saturation in the western basin, 50 percent in the central basin, and 85 percent in the eastern portion.

The bar-built estuaries along Long Island's south shore have maximum depths of about twelve feet and extensive areas which are much shallower. The narrow inlets restrict the tidal inflow and the circulation is poor. Currents in the inlets are around two knots but are less than half that in the estuaries themselves, where the wind is responsible for a large part of the feeble circulation. There is evidence of an eastward flow of water from Great South Bay to Moriches Bay to Shinnecock Bay through the narrow straits connecting them. These estuaries are generally not stratified, but the sub-estuaries of the small streams entering them may be. These estuaries have a low pollution assimilation capacity and are occasionally subject to algae blooms. Like Long Island Sound, nitrogen appears to be the limiting nutrient.

SOCIO-ECONOMIC CHARACTERISTICS

Population in the Long Island Region was 1,966,955 in 1960, the year of the last complete U. S. Census. It is estimated that the population in this Region will grow to 4,211,000 or 114 percent by 1990. Nassau County population will increase from 1,300,171 in 1960 to 1,674,000 or 29 percent, but Suffolk County population is expected to advance by 280 percent, from a 1960 figure of 666,784 to 2,537,000 in 1990, as shown in Table VII-1.

According to a private survey conducted in January 1966, the Nassau County population had increased nine percent in the five-year interval, 1960-1965, and the Suffolk County population advanced by 41 percent during the same period. The results of this recent survey would seem to support the 1990 population growth projections.

The main reason for the Suffolk County population growth can be attributed to demographic factors, such as high birth rates, and younger-than-average heads-of-households.

Nassau County, with 300 square miles, had a 1960 population density of 4,333 persons per square mile and by 1990 it should increase to 5,580. The Suffolk County (922 square miles) population density will be 2,751 persons per square mile in 1990 compared to 723 persons

per square mile in 1960.

For the entire Region (Nassau and Suffolk Counties), the 1960 population density was 1,610 persons per square mile, and by 1990 is estimated to be 3,446 persons per square mile, representing a 114 percent change over the 30 year period.

Analysis of the employment patterns (wage and salary employment covered by Social Security) in the Region show that 139,000 or 32 percent of the total 433,000 covered workers were in manufacturing positions. Trade (both wholesale and retail) provided the second largest source of employment, 129,000 jobs for workers in the Region. Persons engaged in a wide range of service activities (bartenders, bankers, and bus drivers) comprised the third largest employment category, numbering nearly 78,000.

The 433,000 employed in the Region represent eight percent of the total New York State covered employment of 5,276,000, and 14 percent of the New York City total employment of 3,072,000.

Manufacturing in the Region is diffused among all major industries usually found in this part of the Nation, but four major industries provide 68 percent of the total factory employment here. These four and their share of all manufacturing jobs are transportation equipment (motor vehicles, aircraft and ships) with 29 percent, electrical machinery with 26 percent, printing and publishing with 7 percent, and apparel with 6 percent.

TABLE VII-1

DISTRIBUTION AND PROJECTION OF POPULATION
IN THE LONG ISLAND REGION, BY REGION
AND COUNTY, 1960 AND 1990

Region and County	Total County Population 1960	HCMC Project % Population 1960 1/	Long Island Region % Population 1960 2/	Long Island Region Population 1960	Long Island Region Population 1990
Nassau	1,300,171	100.0	100.0	1,300,171	1,674,000
Suffolk	666,784	100.0	100.0	666,784	2,537,000
Long Island Region Total			10.2	1,966,955	4,211,000

1/ Total 1960 HCMC Project Population - 19,292,000.

2/ Refers only to the Long Island portion within HCMC Project.

Sources: U.S. Bureau of the Census, 1960; Demographic Projections, New York State Office of Planning Coordination.

VIII - WATER USE

WATER SUPPLY

Present Demands

The following information on present water supply systems in the Long Island Region, serving more than 1,000 persons each, is based on the 1963 FWPCA Municipal Water Facilities Inventory and on State and other data, and summarized in Table VIII-1

Within the Region, there are 52 known municipal water supply systems which serve approximately 1,743,000 persons, with an average daily consumption of 161.5 MGD or 93 gallons per capita per day. Of these systems, 51 serving 1,740,000 persons (99.8% of the total) with 161.3 MGD rely solely on ground water sources. One system serving 3,000 persons relies on a combination of both surface and ground water sources.

There are eleven systems on Long Island that furnish 67 percent (108.0 MGD) of the total daily consumption to a population of approximately 1,242,000 persons. These systems are listed in Table VIII-2.

The total average industrial water demand in the Long Island Region for 1962 was 77 MGD. Of the 77 MGD, an estimated 39 MGD was supplied by municipal sources and 38 MGD was supplied by privately owned wells.

An estimated 389,700 persons utilize individual wells and other private water supply sources. These systems supply an estimated 40 MGD of domestic and agricultural water. Almost 95 percent of the persons served by private supplies live in Suffolk County. Ground water aquifers serve the great majority. Separate supplies for irrigation are not considered significant.

Future Requirements

The following estimates of future water supply needs in the Long Island Region are based upon population projections as outlined in Section VII and the present per capita water consumption for the Region as reported by the Senate Select Committee on Water Resources.

Average daily water consumption in the Region in 1966 is estimated as 122 gallons per capita. It is projected that by the year 1990 this usage will have increased to approximately 230 gallons per capita, of which 76 percent is attributed to domestic, commercial and other public use and the remainder allocated to industrial use. This distribution

of the projected 1990 per capita water use can vary markedly depending on the dynamics of growth and demand registered by industry and all other users. Technological advances in home appliances, and changing recreational uses and commercial demands may accelerate the projected upward trend towards more liberal water use patterns.

It is estimated that by 1990 the municipal water needs in the Long Island Region will amount to 920 MGD, with 700 MGD for domestic, commercial and other public use and the balance for industrial requirements. This estimated future consumption will be almost six times the current water usage.

The self-supplied industrial demand is estimated to be 54 MGD by 1990. The demand by industry in Suffolk County is expected to grow at a rate nearly double that in Nassau County.

As the population density in Suffolk County increases, a high percentage of the population will be served by municipal systems that will be expanded from present systems or created where none now exist. It is estimated that in 1990, 95 percent of the population of the Long Island Region will be served by municipal water supply systems while 89 percent of the persons in the Region are now served. The number of persons who are privately supplied will decrease to 211,000 and the amount of water consumed by such users will decrease to 30 MGD as per capita consumption for private owners jumps from 100 gpcd to 130 gpcd.

Future needs (1990) which exceed dependable yields in parts of the Region can only be met by programs aimed at the comprehensive development of the Region's limited surface water resources and endangered ground water supplies.

Resource development projects presently being considered are:

(1) Waste water renovation by tertiary treatment. Pilot plant studies are now being made in Nassau County.

(2) Waste water reclamation by ground water recharge. Treated waste waters which have not had sufficient treatment for immediate public use would be injected into aquifers to prevent salt water intrusion and to allow time for further natural treatment of the waste water in the aquifer so that the water could be reused.

(3) Desalination of sea water and brackish water, which is not yet considered economically feasible.

(4) Purchase and transfer of water from New York City if water becomes available through development of their supplies.

RECREATION

The waters of the Long Island Region are used intensively for bathing, sport fishing, boating, skin-diving, and water-skiing.

Bathing

Recreational bathing is a major water use in the Region. The almost continuous barrier beach along the south shore of Nassau and Suffolk Counties provides excellent bathing and associated sports. Jones Beach State Park, with facilities for over 100,000 bathers and 20,000 automobiles, a Marine Theater, a two-mile boardwalk, game areas and play areas, is considered to be the finest ocean front recreational area in the nation. County, town and community beaches along the shores of Nassau and Suffolk County similarly serve the resident population and many New York and New Jersey visitors.

Recreational Boating

Recreational boating is widespread throughout the Region. The many sheltered bays and inlets of the north and south shores of the Region are used extensively by more than 175,000 pleasure boats. The development of marinas and associated facilities (159 marinas with 11,400 marina berths are presently in the Long Island Region) to meet present and future recreational boating needs will result in greater pollution unless closer regulatory and surveillance activity is provided.

Parks

Jones Beach State Park with many recreational facilities, is the largest (2413 acres) and most popular (12,412,600 total visits in 1963) state park in the Region. In addition to Jones Beach State Park, there are 14 other state parks and several county parks in the Region, which presently serve the resident population and visitors from New Jersey and other parts of New York State.

Sport Fishing

Fresh water fishing is very intensive and increasing each year west of Patchogue in Suffolk County, but is rather limited in eastern Suffolk County and in Nassau County. The New York State Conservation Department stocks several lakes and ponds in Suffolk County with bass, pickerel and panfish. Five lakes and

streams in Suffolk County are stocked with trout by the New York State Conservation Department.

Salt water fishing is a very important activity in the Region, particularly in Great South Bay where 380,000 anglers fish each year between April and October. Each year between one and 1.5 million fluke are landed in the Bay by hook and line, and similar numbers of winter flounder are also taken.

Waterfowl

The Long Island Region affords only moderately abundant waterfowl hunting, which attracts some resident and non-resident recreation seekers and stimulates business activities. Many of the marshes and wetlands provide good hunting, but pollution caused by the discharge of domestic and industrial wastes and by drainage from agricultural lands, dredging, and the filling of marsh lands to meet expanded residential and commercial needs have depleted the waterfowl population and significantly limited the development of this natural recreational resource.

COMMERCIAL FISHING

Shellfishing

In 1966, the total New York State output of hard and soft clams, bay scallops and oysters came from Nassau and Suffolk Counties. This output had a dockside value of $6.5 million and accounted for 77 percent of New York State's 1966 shellfish dollar volume. Long Island is the Nation's leader in hard clam production, in spite of the fact that output today is only 60 percent of what it was 20 years ago. Bay scallop production has varied from $100,000 to $700,000 due to year to year variations in setting and survival conditions. The value of oyster output in this Region has declined 99 percent in the past 50 years from $50 million to less than half a million dollars. This can be attributed to such factors as bacterial sewage pollution, duck waste nutrient pollution, destruction of the wetlands by uncontrolled dredging and filling (which has curtailed the growth of microorganisms necessary for shellfish production), spraying of DDT and other insecticides on wetlands, and dredging of shellfish bottom lands. Alone and in combination, these factors have resulted in the closing of approximately 50,000 acres, or almost eight percent of the total shellfish growing area in the Region. Nassau County shellfish industry has been hit the hardest since almost a quarter of its total shellfish acreage has been closed. The principal natural factors which have contributed to the oyster industry decline are the destruction of

natural seed beds by adverse weather conditions, the encroachment of predators detrimental to shellfish and the silting of Moriches and other inlets which has lowered the flushing ability of Great South and Moriches Bays.

Finfishing

Commercial finfishing in this Region declined 62 percent from 133.6 million pounds in 1965 to 50.5 million pounds in 1966. In dollar value, the industry decline was 17 percent, from $3.5 million to $2.9 million.

TABLE VIII-1

MUNICIPAL WATER FACILITIES
SERVING 1000 PERSONS OR MORE,
LONG ISLAND REGION
SUMMARY

Source	Facilities No.	Est. Pop. Served	Consumption
Surface	none	none	none
Wells	51	1,740,055	161.3
Both	1	3,000	0.2
GRAND TOTAL	52	1,743,055	161.5

TABLE VIII-2

MAJOR WATER SUPPLY SYSTEMS,
LONG ISLAND REGION

Name	Est. Pop. Served	Consumption MGD	Source of Supply
Suffolk County Water Authority	375,450	28.2	wells
Jamaica Water Supply Co.	130,820	13.9	wells
Manhasset-Lakeville Water District	42,870	3.7	wells
Jericho W.D.	44,800	6.6	wells
Hicksville W.D.	49,000	6.1	wells
Long Island Water Corp.	247,000	22.4	wells
N. Y. Water Service Corp.	156,000	11.7	wells
Levittown W.D.	55.000	4.5	wells
Massapequa W.D.	46,360	3.5	wells
East Meadow W.D.	50,000	3.8	wells
South Farmingdale	45,000	3.6	wells

IX - BIBLIOGRAPHY

Inventory of Municipal and Industrial Waste Facilities in Connecticut July 1, 1956, A Cooperative State Federal Report.

Report of Northeastern States Boating. Administrative Conference, May 17-19, 1966.

Anderson, B.A. and C.B. Ham, Index of Surface Water Records to December 31, 1963, Part 1 - North Atlantic Slope Basins, Geological Survey, Circular 501, Washington, 1965.

Bumpus, Dean F. Limnology and Oceanography, Supplement to Volume 10. November 1965.

Bumpus, Dean F. and Louis M. Lauzier. Surface Circulation on the Continental Shelf. Serial Atlas of the Marine Environment, Folio 7, American Geographical Society, 1965.

Description Data of Sewerage and Sewage Treatment Systems in New York State Bulletin No. 20.

Statistical Abstract of Nassau & Suffolk Counties, Long Island, N.Y. The Franklin National Bank of Long Island, 1962.

Hudson-Champlain and Metropolitan Coastal Comprehensive Water Pollution Control Project, FWPCA, Metuchen, New Jersey. (Various unpublished reports and studies).

Hagstroms Atlas of Nassau County, Long Island, N.Y. 3rd Edition Hagstrom Co., Inc. 1962.

Waterway Guide 1967, Northern Edition Inland Waterway Guide, Inc., 1966.

Interstate Sanitation Commission, 1966, on the Water Pollution Control Activities and the Interstate Air Pollution Program.

Metzler, D.F., "States Plan Ahead for Pollution Abatement", Journal WPCF, January 1967, pp. 13-20.

Municipal Water Facilities Communities of 25,000 Population and Over United States and Possessions As of January 1, 1964.

Apartments - Their Past and Future Impact on Suburban Living Patterns, Nassau County Planning Commission, Mineola, Long Island, New York, December 1963.

Aspects - An Analysis of Social, Economic and Housing Characteristics of Nassau County, New York, Parts 1-7, Nassau County Planning Commission, Mineola, Long Island, New York, 1962.

A Study of the Availability for Transportation Centers in Nassau, Nassau County Planning Commission, May, 1965.

Building in the Fifties - A Summary of Building Activity Reports, Nassau County Planning Commission, 1960.

Industrial Land and Taxation: A Supplement to "Industry's Nassau County", Nassau County Planning Commission, Mineola, New York, December, 1965.

Industry in Nassau County, Nassau County Planning Commission, 1962.

Parks and Recreation, Nassau County Planning Commission, July, 1964.

Population Sixty, Nassau County Planning Commission, February, 1961.

Selected Population and Economic Data, Nassau County, Nassau County Planning Commission, April, 1965.

Senior Citizens: Social and Economic Characteristics, Nassau County Planning Commission, July, 1965.

Estimated Population Projections. Research and Statistics Section, New Jersey Department of Conservation and Economic Development, 1966.

New York State Industrial Directory. New York, 1966.

Water Resources Management, N.Y. State Commission on Water Resources Planning, 1965 & 1966.

Business Fact Book, Nassau - Suffolk District, Pt. 1, Business & Manufacturing, N.Y. State Dept. of Commerce 1962.

Business Fact Book, Nassau - Suffolk District, Pt. 2, Population & Housing, N.Y. State Dept. of Commerce 1963.

Classifications and Standards of Quality and Purity for Fresh Surface Waters and Tidal Salt Waters Within the Great South Bay - Easterly Section Drainage Basin in Suffolk County, N.Y., New York State Department of Health, Water Pollution Control Board, 1954.

Classifications and Standards of Quality and Purity for Fresh Surface Waters and Tidal Salt Waters Within the Shinnecock Bay - Mecox Bay Drainage Basin in Suffolk County, N.Y., New York State Department of Health, Water Pollution Control Board, 1954.

Periodic Report of the Water Quality Surveillance Network 1960 thru 1964. New York State Department of Health, December 1965.

Surface Waters of Eastern Suffolk County, N.Y. State Dept. of Health 1963.

Surface Waters of Nassau County, N.Y. State Dept. of Health 1963.

Surface Waters of Western Suffolk County, N.Y. State Dept. of Health 1963.

Survey Report #62 Underground Waters of Nassau County New York State Dept. of Health 1964.

Effect of Cabin Cruiser Waste Discharge on Eaton's Neck, Long Island Harbor Waters, New York University College of Engineering Research Division, Air and Water Pollution Research Section, December, 1953.

The States & Potential of the Marine Environment, Oceanographic Committee of the Nassau - Suffolk Regional Planning Board, Dec., 1966.

Demographic Projections for New York State Counties. Office of Planning Coordination, Albany, New York, July 1966.

Reappraisal of Drought in Northeastern United States, 1965.

Report on the Costs of Secondary and Tertiary Sewage Treatment Plants, 1966.

The Resources of the New England - New York Region, Part 2, Chapter XXVIII, St. Lawrence Drainage Basin, New York 1954.

Schlirck, Louis B. Man in Metropolis.

Annual Report, 1965, Suffolk County Department of Health, 1965.

U.S. Bureau of Census. Census of Housing: 1960. Washington, 1960.

U.S. Bureau of Census. County Business Patterns: 1964 and 1956.

U.S. Bureau of Census. Statistical Abstract of the United States: 1966, Washington, D.C., 1966.

Fishery Statistics of the U.S. - 1964. Statistical Digest No. 58, U.S. Bureau of Commercial Fisheries.

U.S. Census of Population, 1960 Connecticut.

U.S. Census of Population, 1960 Connecticut General Social and Economic Characteristics.

Recreational Boating Statistics, 1965. U.S. Coast Guard.

N.Y. Landings, U.S. Dept of the Interior Fish & Wildlife Service Bureau of Commercial Fisheries N.Y. Conservation Dept. Bureau of Marine Fisheries 1966.

Public Sector Inventory, U.S. Dept. of the Interior Bureau of Outdoor Recreation 1963.

Modern Sewage Treatment Plant; How Much Do They Cost, U.S. Dept. of Health, Education and Welfare, Public Health Service, Division of Water Supply and Pollution Control, Washington, 1964. (PHS Publication No. 1229).

Municipal Water Facilities, 1962 Inventory, U.S. Department of Health, Education and Welfare, Public Health Service, Division of Water Supply and Pollution Control, Basic Data Branch, PHS Publication No. 1165, Vol. 1-2, 1963.

Municipal Water Facilities, 1963 Inventory, U.S. Department of Health, Education and Welfare, Public Health Service, Division of Water Supply and Pollution Control, Basic Data Branch, PHS Publication No. 775 (revised) Vol. 1-2, 1964.

Waste Water Disposal Practices at Federal Installations 1960 Volume 33 - New York, 1960.

Waterborne Commerce of the United States Calendar Year 1960 Part I Waterways and Harbors Atlantic Coast.

Col. Thomas H. Wiggan, Report on a Comprehensive Plan for the Development and Distribution of the Available Water Supply of Suffolk County, Long Island, N.Y. (Suffolk County, New York, Suffolk County Water Authority, January, 1957). p 2A.

Manganaro, Martin & Lincoln, 1966, Report, Outfall Sewer Location Sludge Disposal Facilities Disposal District No. 3.

Bowe, Albertson and Walsh, 1965, Report, Comprehensive Sewerage Studies, Five Western Towns, Suffolk County New York, Disposal District No. 1.

APPENDIX A

CRITERIA FOR PRIORITY DETERMINATION

A system of priority ranking was developed for municipal and industrial construction needs, based on a series of criteria which indicate the urgency of abatement for each waste source. These criteria, which are in the form of a weighted scoring system, were applied to each known waste source. All sources were then ranked on the basis of final score, and divided into four priority groups, on the basis of engineering and economic judgment.

The criteria used to evaluate and rank the municipal treatment needs are presented in Table A-1. The scoring system includes such factors as existing treatment type, BOD loading discharged, size and use of the receiving stream, and previous enforcement activity.

A separate set of criteria which recognize the variation in industrial waste characteristics, were developed to rank industrial needs by priority. These criteria, shown in Table A-2, include such factors as waste toxicity, solids and color in addition to the factors used for municipal waste.

TABLE A-1

PRIORITY CRITERIA - MUNICIPAL WASTES

Aggregate Weight Adjusting Factors

		Percent
I	Type of Treatment.	35
II	Population Equivalents (P.E.)-Discharged (BOD) . . .	25
III	Receiving Water Use and Dilution	35
IV	Prior Orders Issued.	5

Enumerated Categories by Weight

I.A Type of Treatment

Bases	Wt.
No Treatment	100
Primary - No Chlorine - Overloaded	90
Primary - Chlorine - Overloaded	80
Primary - No Chlorine - Within design	70
Primary - Chlorine - Within design	60
Intermediate - No Chlorine - Overloaded	80
Intermediate - Chlorine - Overloaded	70
Intermediate - No Chlorine - Within design	50
Intermediate - Chlorine - Within design	40
Secondary - No Chlorine - Overloaded	70
Secondary - Chlorine - Overloaded	60
Secondary - No Chlorine - Within design	30
Secondary - Chlorine - Within design	0

II.A P. E. Discharged

BOD Range	
0 - 100	5
100 - 1000	10
1000 - 10,000	25
10,000 - 100,000	50
Over 100,000	100

III.A Receiving Water Use and Dilution

A Use

Drinking Water	80
Shell Fishing and/or Recreation	38
Sport Fishing	25
Other Uses	10

B Dilution

Large	0
Medium	15
Small	50

TABLE A-1 (CONT'D.)

			Wt.
IV.A		Prior Orders Issued	
	Yes		100
	No		0

TABLE A-2

PRIORITY CRITERIA - INDUSTRIAL WASTES

Aggregate Weight Adjusting Factors		Percent
I	Effluent Waste Characteristics.	30*
II	Volume of Wastes.	30
III	Receiving Water Use and Dilution.	40

Enumerated Categories by Weight		
I	Effluent Waste Characteristics*	Percent of Wt.
	A. Bacteria	
	less than 1 x 10^5 total coliform/100 ml	5
	between 1 x 10^5 to 1 x 10^6 total coliform/100 ml	20
	greater than 1 x 10^6 total coliform 100 ml	30
	B. BOD	
	less than 20 mg/l	0
	20 - 100 mg/l	5
	100 - 300 mg/l	10
	300 - 600 mg/l	15
	greater than 600 mg/l	20
	C. Color and/or foam	
	if significant in stream	5
	D. Floating Solids - oil, grease	
	if significant in stream	10
	E. pH	
	less than 5 or greater than 10	5
	F. Temperature rise	
	greater than 5°F in stream	10

TABLE A-2 (CONT'D.)

G. Total Suspended Solids	
less than 75 mg/l	0
75 - 200 mg/l	10
greater than 200 mg/l	20
H. Toxic Chemicals	
toxic to fish in stream	50

*It can be noted that on the basis of the percent of weight, that the total weight of 30 can be exceeded. This is necessary in order to develop the proper priority when considering highly significant waste characteristics.

II A. Volume of Wastes	Percent of Wt.
Item	
1,000 - 10,000 gal. per day	10
10,000 - 100,000 gal. per day	20
100,000 - 1,000,000 gal. per day	50
1,000,000 - 5,000,000 gal. per day	100
greater than 5,000,000 gal. per day	150

III Receiving Water Use & Dilution	Percent of Wt.
A. Use	
Drinking Water	80
Shell Fishing and/or Recreation	38
Sport Fishing	25
Other	10
B. Dilution	
Large	0
Medium	15
Small	50

APPENDIX B

CONSTRUCTION ACTIVITY CODING

Two basic assumptions were used throughout in determining construction needs. Minimum acceptable treatment was defined as secondary treatment for municipal waste or its equivalent for industrial waste. All existing treatment plants constructed more than 20 years ago were considered obsolete and in need of complete replacement.

A system of construction coding was formulated to indicate the kind and amount of construction activity required to abate each municipal and industrial waste discharge. Each source was coded by an activity as shown in Tables B-1 (Municipal) or B-2 (Industrial).

TABLE B-1

MUNICIPAL CONSTRUCTION ACTIVITY CODES

Type of Facility	Status of Waste Source	Code Number
No Plant	Discharging raw sewage-build primary and secondary plant	01
Primary Plant	Not suitable for upgrading to secondary, build a new secondary plant	02
	Suitable for upgrading to secondary, if overloaded build secondary for overload	04
Intermediate Plant	Not suitable for upgrading to secondary, build a new secondary plant	03
	Suitable for upgrading to secondary, if overloaded build secondary for overload	05
Secondary Plant	Condition Good - if overloaded build secondary for overload only	06
	Condition Fair to Poor - if not overloaded continue to use	07
	Condition Fair to Poor - If overloaded build new secondary for total load	08
Any Plant or No Plant	Do not build or reconstruct, plant to be shut down and load picked up by another plant (load has been added to other unit)	09
	Replace septic tanks with new plant and collection system	10

TABLE B-2

INDUSTRIAL CONSTRUCTION ACTIVITY CODES

Code Number	Type of Activity
A	Provide secondary treatment or equivalent, including chlorination
B	Provide secondary treatment or equivalent
C	Provide for segregation and separate treatment of one or more types of waste that may include suspended solids, toxic matter, oil and/or grease, color and high or low pH
D	Same as C; plus biological treatment for all or part of the wastes, including chlorination

APPENDIX C

COST ESTIMATING PROCEDURES

Estimated costs of needed municipal construction activities were developed, using as a basis an unpublished study of sewage treatment needs in the Hudson River basin above Chelsea, New York.[1/] This study presented a sliding scale of unit cost by population served and by type of construction required.

In developing cost estimates, it was recognized that waste treatment facilities constructed in the immediate future should be designed for anticipated population growth through 1990, to allow for a plant life of 20 years. However, since no data are available to provide reasonable projections of sewered population on an individual plant basis, estimates were prepared for the region as a whole and then adjusted to reflect the needed additional capacity.

A basic cost was calculated for each municipal plant, using the present population served, the needed construction activity and the unit cost data. The results were summed for each priority and construction activity code and corrected by the FWPCA construction cost index projected to 1970. A 20 percent factor was then added to cover engineering, legal and other services, after which the cost estimates were revised to reflect the anticipated regional growth through 1990. Cost estimates for ancillary works, such as interceptor sewers, pumping stations and force mains were calculated as 83 percent of the treatment plant cost, based on the Study referred to above.

Industrial cost estimates were prepared by assuming equivalency between the costs of industrial and municipal plants to treat the same magnitude of organic loadings, expressed in terms of population equivalents, with the results projected to 1990 on the basis of anticipated growth of industrial water use. Ancillary works, such as process changes and segregation of wastes, were estimated as 50 percent of the treatment plant cost.

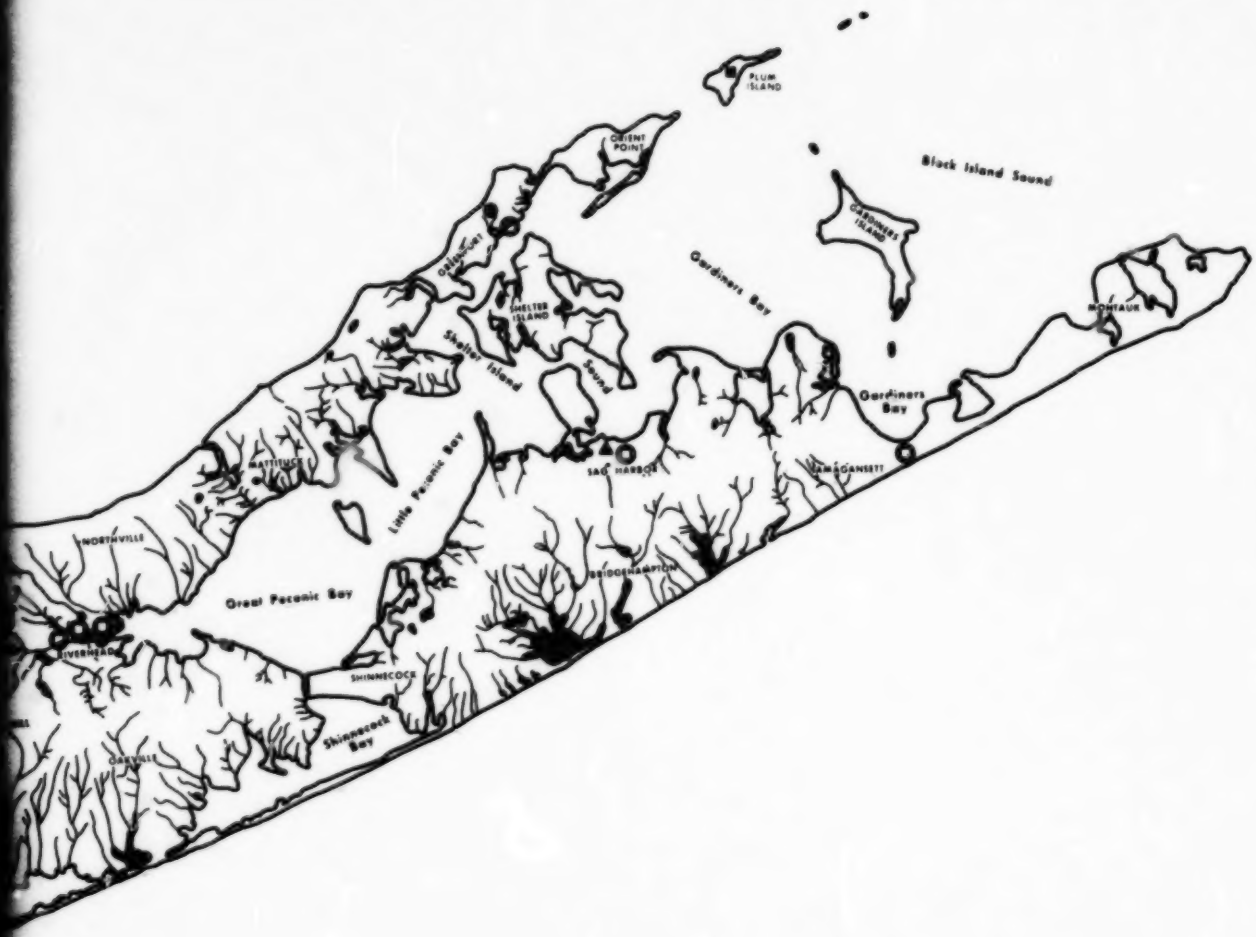
1/ Basic Data Branch, DWSPC, Public Health Service (now Division of Pollution Surveillance, Technical Programs, FWPCA) August 10, 1965, Subject "Sewage Treatment Needs in Hudson River Basin above Chelsea"

LEGEND
Primary treatment plant
Intermediate treatment plant
Secondary treatment plant
Raw
Industrial discharge to surface water
Industrial discharge to ground
Industrial discharge to ground with no. of plants in one area
N
Hudson River
East River
Manhasset Bay
Little Neck Bay
Hempstead Harbor
Oyster Bay Harbor
Cold Spring Harbor
Huntington Bay
Northport Bay
Smithtown Bay
SEA CLIFF
ROSLYN
LAKE SUCCESS
MINEOLA
WESTBURY
HICKSVILLE
PLAINVIEW
FARMINGDALE
HUNTINGTON
COMMACK
BRENTWOOD
OAKDALE
AMITYVILLE
FREEPORT
LYNBROOK
Hempstead Bay
East Bay
Jamaica Bay
Reynolds Channel
LONG BEACH
JONES BEACH
FIRE ISLAND
A

GPO 988-082

N
ORIENT POINT
Gardiners
Orient Point
SHELTER ISLAND
Shelter Island
Sound
MATTITUCK
Little Peconic Bay
SAG HARBOR
NORTHVILLE
BAITING HOLLOW
ROCKY POINT
Great Peconic Bay
BRIDGEHAMPTON
PORT JEFFERSON
Peconic River
RIVERHEAD
SHINNECOCK
BALD HILL
MIDDLE ISLAND
UPTON
MANORVILLE
OAKVILLE
Shinnecock Bay
SELDEN
YAPHANK
Lake Ronkonkoma
MEDFORD
MORICHES
Carmans River
Moriches Bay
PATCHOGUE
OAKDALE
Great South Bay
Scale in Miles
5
0
5
10

1



LONG ISLAND REGION
MUNICIPAL AND INDUSTRIAL WASTE SOURCES
APRIL 1967
NASSAU AND SUFFOLK COUNTIES
U.S. DEPARTMENT OF THE INTERIOR FEDERAL WATER POLLUTION CONTROL ADMINISTRATION NORTHEAST REGION HUDSON CHAMPLAIN AND METROPOLITAN COASTAL PROJECT